



**Middle Tennessee State University  
Board of Trustees  
Academic Affairs, Student Life, and  
Athletics Committee**

---

September 4, 2019  
9:00 am

MEC Training Room – 2<sup>nd</sup> Floor  
Miller Education Center  
503 East Bell Street  
Murfreesboro, Tennessee 37132





**Middle Tennessee State University  
Board of Trustees**

**Academic Affairs, Student Life, and Athletics Committee**

---

September 4, 2019  
9:00 am

**AGENDA**

Call to Order and Opening Remarks

Roll Call

Approval of Minutes (Action) ..... [Tab 1](#)

Approval of New Academic Degree Program (Action) ..... [Tab 2](#)

Bachelor of Science (B.S.) in Data Science

Approval of Policy Revision (Action) ..... [Tab 3](#)

Policy 501 Residency Classification

Athletics Update (Information) ..... [Tab 4](#)

Closing Remarks

Adjournment





**Middle Tennessee State University  
Board of Trustees**

**Academic Affairs, Student Life, and Athletics Committee**

**Action Item**

DATE: September 4, 2019

SUBJECT: [Minutes of the May 29, 2019 Academic Affairs, Student Life, and Athletics Committee Meeting](#)

PRESENTER: Pam Wright, Committee Chair

---

**BACKGROUND INFORMATION:**

The Academic Affairs, Student Life, and Athletics Committee met on May 29, 2019.

Attached for your review and approval are the minutes from this meeting.



**MIDDLE TENNESSEE STATE UNIVERSITY  
BOARD OF TRUSTEES**

**ACADEMIC AFFAIRS, STUDENT LIFE, AND ATHLETICS COMMITTEE  
MINUTES**

The Academic Affairs, Student Life, and Athletics Committee met on May 29, 2019, in the Miller Education Center Meeting Room at Middle Tennessee State University.

**Call to Order and Opening Remarks**

Committee Chair Pam Wright called the meeting to order at 10:52 a.m. President McPhee gave welcoming remarks.

**Roll Call**

The following Committee members were in attendance: J.B. Baker, Pete DeLay, Joey Jacobs, Tony Johnston, Steve Smith, Pam Wright, Peyton Tracy, Keith Huber, and Chris Massaro. A quorum was declared present.

Trustee Darrell Freeman, Sr.; President Sidney A. McPhee; Alan Thomas, Vice President for Business and Finance; Cheryl Torsney, Vice Provost for Faculty Affairs; Joe Bales, Vice President for University Advancement; Andrew Oppmann, Vice President for Marketing and Communications; Bruce Petryshak, Vice President for Information Technology and Chief Information Officer; Deb Sells, Vice President for Student Affairs and Vice Provost for Enrollment and Academic Success; Brenda Burkhardt, Chief Audit Executive; Heidi Zimmerman, University Counsel and Board Secretary; and, Kim Edgar, Assistant to the President and Chief of Staff were also in attendance.

**Approval of Minutes**

The first agenda item was approval of the minutes from the March 18, 2019 Academic Affairs, Student Life, and Athletics Committee meeting. Trustee Smith moved to approve the minutes

from the March 18, 2019 meeting and Trustee Baker seconded the motion. A voice vote was taken and the motion to approve the minutes from the March 18, 2019 meeting of the Academic Affairs, Student Life, and Athletics Committee carried.

#### **Approval of Tenure and Promotion Candidates**

The next action item was approval of candidates for tenure and promotion. Vice Provost Torsney presented thirty-nine (39) faculty recommended for tenure and seventy-five (75) faculty recommended for promotion and said they were reviewed at four levels before the Provost and President reviewed and made their recommendations.

A motion was made by Trustee Johnston to approve thirty-nine (39) candidates for tenure and seventy-five (75) candidates for promotion. Trustee DeLay seconded the motion.

A voice vote was taken and the motion to approve thirty-nine (39) candidates for tenure and seventy-five (75) candidates for promotion carried unanimously.

#### **Academic Degree under Consideration**

##### **Bachelor of Science (B.S.) in Public Writing and Rhetoric**

Vice Provost Torsney introduced Assistant Professors Eric Detweiler and Kate Pantelides from the Department of English. Development of this degree program began based on responses from employer surveys and increased participation in English electives by science and other majors. Employers want graduates with a broad set of written communication skills that could apply in a variety of public and professional settings. Pending the approval of the Board of Trustees and results of feasibility studies, the University may submit a Letter of Notification to THEC.

A motion was made by Trustee Smith to approve the academic degree under consideration. Trustee DeLay seconded the motion.

A voice vote was taken and the motion to approve the academic degree under consideration carried unanimously.

### **Notification of Academic Action**

#### **Establishment of Free Speech Center**

Vice Provost Torsney introduced Ken Paulson, Dean of the College of Media and Entertainment.

Dean Paulson said the Free Speech Center aims to reignite and transform the American conversation about free speech through information and education. The Center is intended to be a national organization modeled in part on the First Amendment Center, and would be apolitical, nonpartisan, and not involved in politics or litigation. It will be funded with a combination of institutional reallocation and external support.

### **Athletics Update**

President McPhee has convened a committee of Athletics, Student Affairs, and legal staff to review the concerns brought before the Board of Trustees at their April 3, 2019.

Vice President Sells said the committee has met twice and determined deliverables for the end of August to address athletics staff behavior and student-athlete complaints.

President McPhee added that we are being proactive, and this issue is allowing us to do some self-examination and make improvements.

### **Closing Remarks**

President McPhee invited Lauren Collier, THEC Director of Institution and Board Affairs, to address the Committee. She told the Committee that there will be a professional development event for the boards of all locally-governed institutions on August 15 and 16 at the University of Memphis. The governor will attend along with experts from around the country. More information will be sent in the coming weeks.

**Adjournment**

The meeting adjourned at 11:29 a.m.

Respectfully submitted,

Academic Affairs, Student Life, and Athletics Committee

DRAFT



**Middle Tennessee State University  
Board of Trustees**

**Academic Affairs, Student Life, and Athletics Committee**

**Action Item**

DATE: September 4, 2019

SUBJECT: Approval of New Academic Degree Program

PRESENTER: Mark Byrnes, Provost

---

**BACKGROUND INFORMATION:**

THEC has the statutory responsibility to review and approve new academic programs (THEC Policy A 1.0).

Before submission to THEC, the proposal for a new academic program must be approved by the MTSU Board of Trustees.

The proposal to create a Bachelor of Science in Data Science is attached for review and approval.



**NEW ACADEMIC PROGRAM PROPOSAL**  
**B.S. in Data Science**

August 2019  
Table of Contents

Letter of Notification	1
Implementation Timeline	10
Curriculum	10
Program Learning Outcomes	10
Program Requirements	11
Current Courses and Existing Programs	12
New Courses Needed	12
Distance Learning	12
Course Syllabi	12
Academic Standards	12
Equity	13
Program Enrollment and Graduates	13
Administrative Structure	14
Faculty Resources	14
Current Faculty	14
Anticipated Faculty	15
Library and Information Technology Resources	16
Library and Information Technology Acquisitions Needed	16
Support Resources	16
Evidence of Willingness to Partner	16
Other Support Currently Available	16
Other Support Needed	16
Facilities and Equipment	17
Existing Facilities and Equipment	17
Additional Facilities and Equipment Required or Anticipated	17
Marketing and Recruitment Plan	17
Assessment / Evaluation	18
Accreditation	19
Funding	19
Attachment A: THEC Financial Projection Form	
Appendix A: Feasibility Study	
Appendix B: Programs of Study	
Appendix C: Strategic Recruitment Plan	
Appendix D: Letters of Support from Industry	
Appendix E: Faculty Vitae	
Appendix F: Course Syllabi	
Appendix G: Organizational Chart	

## **LETTER OF NOTIFICATION**

**Proposed Program Name:** Data

Science

**Proposed Degree Designation:**

Bachelor of Science (B.S.)

**Proposed CIP Code:**

**11.0802** - Data Modeling/Warehousing and Database Administration.

**Definition:** A program that prepares individuals to design and manage the construction of databases and related software programs and applications, including the linking of individual data sets to create complex searchable databases (warehousing) and the use of analytical search tools (mining). Includes instruction in database theory, logic, and semantics; operational and warehouse modeling; dimensionality; attributes and hierarchies; data definition; technical architecture; access and security design; integration; formatting and extraction; data delivery; index design; implementation problems; planning and budgeting; and client and networking issues.

**Proposed implementation date:**

Fall 2020

**Academic Program Liaison (APL) name and contact information:**

Dr. Peter H. Cunningham  
Vice Provost for Academic Programs  
Middle Tennessee State University  
Cope Administration Building, Rm: 111  
Murfreesboro, TN 37132  
Office: 615-494-7611  
Email: [Peter.Cunningham@mtsu.edu](mailto:Peter.Cunningham@mtsu.edu)

**Background concerning academic program development:**

An interdisciplinary group including Computer Science, Math, Information Systems & Analytics, and Economics and Finance was created to identify possible programs in Data Science. Based on in-depth analysis and several meetings, the committee chose to pursue a Data Science undergraduate degree. Strengths were identified across campus and by bringing in the best components of Data Science from all disciplines, along with a few new courses, this new interdisciplinary program will be a good example of how individuals from across campus can work together to create innovative and needed programs.

**Purpose and Nature of Program:**

We propose a program of study leading to a Bachelor of Science degree in Data Science. Data Science is an interdisciplinary field that covers the use of data to make decisions, gain insight, or develop knowledge. Publications like Forbes and sites like LinkedIn<sup>1</sup> predict that data science will be one of the fastest-growing fields in terms of job availability in the next few years. This program will attract not only traditional but also adult learners to MTSU.

MTSU's growing experience with creating and running interdisciplinary programs makes this university the natural home for this program. Data scientists combine skills from computer science, statistics, and business analytics. Students will learn to start from a business understanding of the question at hand, using it to inform an understanding of the data available. Then they will learn to use skills in the preparation and display of data and in the modeling of data to evaluate the issue at hand. Finally, they will learn skills to deploy the model they created in order to ensure that it is widely used. Students will end their time at MTSU with either a capstone project or an internship, which will allow them to follow the process of data science in a real-world setting and will ensure that they have a portfolio of work to show prospective employers.

#### **Alignment with state master plan and institutional mission:**

The Master Plan for Tennessee Postsecondary Education 2015-2025 calls for a statewide strategic development of higher education programs that increases the educational attainment levels of Tennesseans; addresses the state's economic development, workforce development, and research needs; and calls for institutional mission differentiation to realize statewide efficiencies through institutional collaboration, minimized redundancy, a focus on location, and research.

The proposed Data Science degree meets the State Master Plan in the following ways:

- *Creates an undergraduate degree program and associated curriculum that focuses on one of Tennessee's largest economic growth sectors: data science.*

According to a recent report, between April 2017 to April 2018 there were 2,400 jobs openings in data science and related roles in the middle Tennessee region. Which equates to one job opening for every current filled data science role, which means about 50% of all data science related jobs are filled within the region<sup>2</sup>.

In an article in the Tennessean, by Chief Data Scientist from Asurion, Faker Zouaoui (November 17, 2018), "As a first step in addressing the talent shortage, we must better align our primary, secondary and higher education initiatives"<sup>3</sup>. The shortage of talent is real and although there are opportunities within companies and at the graduate level, one of the missing areas of education is the undergraduate level.

The need for individuals in Data Science will continue to grow and the opportunity to reach Tennesseans earlier in their career is key to meeting these needs. It is not good enough to find adult learners only. Students in K-12 will look for opportunities within higher education and an undergraduate degree in Data Science will attract highly motivated and quant-minded individuals.

- *Provides Tennesseans with the opportunity to prepare for careers in and be part of a growing and sustained workforce in data science.*

Based on projections for job growth from 2017 to 2022 for all technology related jobs, Computer and Information Research Scientists will grow 30% with a median salary of \$85,743, Statisticians will grow by 18% with a median salary of 60,969, and several other job titles (six) that include “analyst” (normally an entry level position for data science) will increase by at least 10% with median salaries around \$70,000<sup>4</sup>.

Therefore, the demand and pay will continue to be attractive to prospective individuals looking to enter a technology related career.

The Proposed Data Science degree also aligns with the mission of Middle Tennessee State University as expressed in the goals of the university’s Academic Master Plan<sup>5</sup>, which looks to:

- I. advance academic quality through excellence in teaching, scholarship, and service and the celebration of MTSU’s strengths
- II. promote student success and individual responsibility for accomplishments through a community dedicated to student-centered learning
- III. develop purposeful and sustainable partnering relationships and outreach
- *MTSU will advance academic Quality through excellence in teaching, scholarship, and service and the celebration of MTSU’s strengths:*

A degree in Data Science brings a unique interdisciplinary approach to education that includes courses and faculty from several departments. The diversity of faculty and programs is a strength of MTSU and by combining these resources into a new degree, it leverages the strengths of MTSU by bringing the best of all areas together.

- *MTSU will promote student success and individual responsibility for accomplishments through a community dedicated to student-centered learning:*

Through an interdisciplinary approach to the curriculum, students will have the opportunity to select a specialization and minor that best fits their expected interests. It is not assumed that data science fits into one industry, such as healthcare or finance. It instead embraces the need to analyze data in every industry, thus giving students the opportunity to be exposed to more than a discipline of Data Science.

- *MTSU will develop purposeful and sustainable partnering relationships and outreach:*

With the creation of Data Science Institute at MTSU, which focuses on research and external partnerships, this degree will be a feeder system for getting students actively involved with external projects and research. This will include opportunities for consulting, research grants, data hackathons, and analysis of data for the good of the community.

### **Institutional capacity to deliver the proposed academic program:**

This is an interdisciplinary program which will involve departments in the College of Business and the College of Basic and Applied Sciences. Except for the five newly proposed DATA courses, all the courses that are a required part of this program are already offered frequently. A few of these courses are at capacity now, so adding new students to these courses will require hiring new faculty. These hires are accounted for in the budget, see Appendix A.

### **Existing programs offered at public and private Tennessee institutions:**

Lipscomb University, a private institution in Tennessee, is currently the only one with a baccalaureate degree program in Data Science. Tennessee Tech and the University of Tennessee at Chattanooga offer concentrations in data science through programs in their engineering colleges. The University of Tennessee at Knoxville and T.S.U. offer a concentration in “business data analytics” which has some overlap with a data science program. Maryville College and Western Kentucky offer degrees in Business Analytics.

### **Program Feasibility:**

A comprehensive study of the feasibility of offering a baccalaureate degree in Data Science was conducted by the MTSU Business and Economic Research Center (BERC) during fall 2018. The final report for the study is attached as Appendix C. Pertinent findings are provided below.

### **Student interest for the proposed academic program.**

Student interest was examined from four perspectives: national trends, state experience, local interest and “feeder” institutions, and surveys of current MTSU students.

**National Trends:** Data Science is new enough that the number of undergraduate degrees being awarded in it is not yet being tracked. We thus make use of the degrees being awarded in the broader disciplines that include data sciences. These broader disciplines we define as those of the NCED CIP codes under which data science programs are currently identifying themselves. As shown in Figure 1 of the Feasibility Study (See Appendix C), the trend in degrees awarded in the combined seven CIP codes used by almost all data science programs is positive. 2015 is the last year for which data is available.

**Evidence from Tennessee:** The number of degree programs in data sciences is growing rather dramatically<sup>6</sup>. So fast, in fact, that an accurate count is very difficult. The website “data science community” lists forty-three bachelors programs in data science<sup>7</sup>. However, we know of a number of institutions that are not on its list, so the true number is higher. The very first of these programs dates only from 2013. So even using forty-three as a reliable number, the speed with which data science programs are being initiated is astounding, closing in on ten a year.

Currently, in Tennessee the only data science B.S. program is at Lipscomb University. Tennessee Tech and the University of Tennessee at Chattanooga offer concentrations in data science through programs in their engineering colleges. The University of Tennessee at Knoxville and T.S.U. offer a concentration in “business data analytics” which has some overlap with a data science program. Maryville College and Western Kentucky offer degrees in Business Analytics. The primary difference between business analytics and a data science program is the former’s inclusion of “classic” business skills such as accounting vs. the latter’s greater emphasis on data management, big data, and software/programming skills.

Because no university program in the U.S. has existed for more than six years, comprehensive information on the popularity of these programs is scant. So, we proxied for this in two ways. First, the College of Charleston, the first university to offer a program in Data Science, grew from 29 full-time majors in 2013 to 41 full-time majors in 2018. Because it is a much smaller school than MTSU, the expectation from Charleston’s experience would be 70 MTSU majors at year five of the program. Almost all other programs are less than four years old. Most are just one or two years old. Based on numbers from eight programs—essentially all that was available—we can show a steady rise in majors over the first three years of any program, the median increases from 11 to 34 over that time frame. None of the programs we examined saw a fall in majors after the first or second years (for more detailed analysis, please see Figure 2 in the Feasibility Report). Iowa State University commenced its Data Science major this fall. In its program proposal it estimated a first-year population of 15 with the number of majors rising to 40 by year six<sup>8</sup>. The University of North Carolina/Charlotte will begin its major in the fall of 2019. In its letter of intent, though it does not estimate a specific number, it concludes “student demand for the proposed BS in Data Science will be robust<sup>9</sup>.”

A final metric that we might use is the experience of similar Masters programs. There are a number of Business Analytics masters programs that have been established recently. (We noted above that at the undergraduate level business analytics shares commonalities with Data Sciences, though they are not the same thing.) The UNC/Charlotte document cited above notes that its masters programs has reached enrollment capacity five years after it was inaugurated. MTSU’s Business Intelligence and Analytics program was launched in 2015. Since then its enrollment has risen from two to twenty-seven graduate students. The increasing demand for master’s degrees in this subject supports the sense that this is field of study in the midst of growing student interest.

**MTSU Survey:** In late October 2018 a survey of interest in Data Science was delivered to 371 MTSU undergraduates in computer science, engineering, information systems, and math/statistics courses. Students in thirty different majors responded to the survey, though of course the majority were in these four areas. Students were asked how likely they would have considered majoring Data Science had the major existed when they began at MTSU and how likely they would now consider this major if were to be available. The students were also asked to rank order their interest in Data Science topics, and to express an opinion about the importance of having a Data Science major at MTSU.

Figure 3 of the Feasibility Report summarizes the key results. Of the 208 juniors and seniors that completed the survey, sixty-four (31 percent) indicated they would have been “likely” or “very likely” to major in Data Science if it was available when they arrived at MTSU. A follow-up question that looks if a student was likely to change their major if a Data Science major was available today (seniors were excluded since it can be assumed that they are too far along in their major to change), twenty-eight percent (85/308) said they would be “likely” or “very likely” to major in Data Science.

Particularly striking are the 120 responses from students not currently majoring in computer science, engineering, information systems, or math/statistics. Ten of these students indicated they were “very likely” to become Data Science majors, and another 26 “likely.” That is thirty percent of these respondents. This may be indicative of significant interest in this major outside its most closely cognate fields.

If but twenty percent of those surveyed that expressed a definite interest in the major followed through on their expression and not a single of MTSU’s other 19,000 students opted to also major in Data Science, the first year of the program would have seventeen students, roughly the average of the first year of this major at other universities. However, it is far more realistic to consider this the low estimate of first year majors. Thirty percent of non-closely cognate majors taking this survey indicated they would be likely or very likely to major in this subject. If but 1 out of 100 from this group across the campus feels similarly, that is 54 majors. To which, if we add our prior group, we would have 71 first year majors. We might consider this a medium to high estimate for the first year.

We have analyzed enrollment, and to the extent possible, degree trends in Data Science. The findings are consistent. The number of degrees awarded are rising. The number of majors are rising. The numbers of programs are rising. Student interest at MTSU appears to be substantial. There is every reason to expect a significant number of students to be attracted to, and to choose to major in, a Data Science program at MTSU. Acknowledging the difficulties of estimating a specific number, given the sparseness and brevity of the data we have, we have given what we think are realistic estimates of the initial size of the program.

### **Local and regional need/demand for the proposed academic program.**

At the state level, both THEC and the Tennessee Department of Economic and Community Development project employment trends. The ECD lists thirteen of the eighteen occupations in SOC code 15 (Computer and Mathematical) as in “high employer demand in 1 or more regions<sup>10</sup>. It also notes that STEM related employment in Tennessee will grow 1.5 times as fast as overall employment growth. THEC’s 2018 report on workforce needs similarly finds that employer demand outstrips supply in “Web/Multimedia Management, Programming,” cluster (code 11.34), the cluster into which it places most of our relevant CIP codes<sup>11</sup>. It estimates that annually 380 more positions are available in this cluster than there are applicants to fill them.

The state’s Department of Labor and Workforce Development identifies each of the SOC codes we are examining as having a “bright outlook statewide<sup>12</sup>. As of December 2018, the Department showed 266 applicants for 309 positions in these occupations.

### **Employer need/demand**

All the CIP Codes used to designate data science programs are designated STEM fields. As is true of most STEM programs, demand for graduates is strong. The 2018 Jobs Rated Almanac lists “Data Scientist” as seventh best among 220 rated occupations, with a 19 percent projected growth in jobs through 2022<sup>13</sup>. Glassdoor, a large job recruiting site that similarly ranks occupations, lists “Data Scientist” first among its top fifty professions based upon job openings, salaries, and job satisfaction. 23,321 data scientist jobs were listed on its website during the month of November, 2018<sup>14</sup>. A more specific study jointly undertaken by IBM, the software consulting firm BurningGlass, and the Business Higher Education Forum, estimated a twenty-eight percent growth in Data Scientists between 2016 and 2020<sup>15</sup>. These projected growth rates far exceed the expected 7.4 percent increase in total American employment from 2016-2026. These sources agree that data science will be among the strongest growing occupations for some time. Indeed, an article in the Harvard Business Review was titled “Data Scientist: The Sexiest Job of the 21st Century<sup>16</sup>. ”

### **Future sustainable need/demand as evidenced in letters from employers.**

See Appendix D

### **Program Costs/Revenues:**

This degree will not require special facilities or equipment. MTSU already offers many of the Data Science courses and has full-time faculty qualified to instruct and lead this program. Core courses will be included from Math, Computer Science, Economics and Finance, and Information Systems & Analytics. Although we have the expertise on campus to offer the needed classes, we do expect that additional faculty will be needed to offer additional sections of classes. We have budgeted for additional full-time and adjunct faculty during the first five years of the proposed program to ensure the implementation of a high-quality program that will meet the projected demand.

Also, since this is an interdisciplinary degree program, we do not expect that it will be housed directly in one department. Therefore, administrative costs were also considered as part of this proposal.

A complete accounting of one-time and recurring costs, as well as revenue projections are provided in Appendix A (THEC Financial Projections Form). Expenses include salaries for additional full-time and adjunct faculty as the program grows as well as funds to support recruitment and program promotion during and after implementation. With the exception of the planning year, the proposed degree will be funded entirely through tuition and fee revenue. For purposes of this Letter of Notification, we have calculated tuition and fee revenue based on a conservative enrollment projection and have used a 3 percent annual increase for recurring expenses as well as for tuition.

## Sources

---

<sup>1</sup> Louis Columbus. 2017. “LinkedIn’s Fastest-Growing Jobs Today Are In Data Science And Machine Learning”.

<https://www.forbes.com/sites/louiscolumbus/2017/12/11/linkedins-fastest-growing-jobs-today-are-in-data-science-machine-learning/#7f86e0a51bd9>

<sup>2</sup> Amy Harris. 2018 “2018 State of Middle Tennessee Tech”. <https://bw-98d8a23fd60826a2a474c5b4f5811707-bwcore.s3.amazonaws.com/photos/MT-Tech-Workforce-2018.pdf>

<sup>3</sup> Faker Zouaoui. 2018. “Are you a data scientist? Nashville needs you.” Tennessean. <https://www.tennessean.com/story/opinion/2018/11/17/nashville-data-scientist-jobs-available-taking-opinion/2012522002/>

<sup>4</sup> Economic Modeling Specialists International. <https://www.economicmodeling.com>. Accessed on 12/28/2018.

<sup>5</sup> “MTSU – Reach for Distinction – The Academic Master Plan, 2015 to 2025”. <https://www.mtsu.edu/AMP/docs/MTSAcademicMasterPlan.pdf>

<sup>6</sup> Emily Tate. 2017. “Data Analytic Programs Take Off,” Insidehighered.com. <https://www.insidehighered.com/digital-learning/article/2017/03/15/data-analytics-programs-taking-colleges>

<sup>7</sup> <http://datascience.community/colleges>. Accessed November 29, 2018.

<sup>8</sup> <http://www.facsen.iastate.edu/sites/default/files/uploads/17-18%20Docket%20Calendar/S17-6%20-%20Data%20Science%20Major.pdf>

<sup>9</sup> <https://provost.uncc.edu/sites/provost.uncc.edu/files/media/LOI-Data-Science-BS.pdf>

<sup>10</sup> Center for Economic Research in Tennessee. LEAP 2018 Occupational Analysis. Tennessee Department of Economic and Community Development.

<sup>11</sup> Academic Supply and Occupational Demand in Tennessee: Workforce Needs and Award Production. 2018. Tennessee Higher Education Commission. <https://www.tn.gov/content/dam/tn/thebureau/research/other-research/supplydemand/Academic%20Supply%20and%20Occupational%20Demand%20-%20Final.pdf>

<sup>12</sup> 19Jobs4tn website:

<https://www.jobs4tn.gov/vosnet/analyzer/drill/drill.aspx?tab=code&session=occdetail&valueName=occupation>. Accessed December 3, 2018.

<sup>13</sup> CareerCast, <https://www.careercast.com/jobs-rated/2018-best-jobs?page=6>. Accessed December 3,

2018.

<sup>14</sup> Glassdoor, [https://www.glassdoor.com/List/Best-Jobs-in-America-LST\\_KQ0,20.htm](https://www.glassdoor.com/List/Best-Jobs-in-America-LST_KQ0,20.htm). Accessed December 3, 2018.

<sup>15</sup> Will Markow, Soumya Braganza, Bledi Taska, The Quant Crunch: How the Demand for Data Science Skills is Disrupting the Job Market. 2017. <https://www-01.ibm.com/common/ssi/cgibin/ssialias?htmlfid=IML14576USEN&>

<sup>16</sup> Thomas H. Davenport and D.J. Patil. 2012. Harvard Business Review. (October). <https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century>.

**Implementation Timeline:** Provide a timeline which includes the following items:

- Accreditation considerations for professional disciplinary accreditation organizations and/or SACSCOC, if applicable

There is no disciplinary accrediting body for this program and SACSCOC does not require a site visit as this is not a substantive change from our currently accredited academic offerings.

- Proposed dates for the external judgment site visit

We propose that the external review take place during late June or during July, 2019.

- Estimated date of submission of the external review report to THEC and the institution (within 30 days after the site visit)

Assuming a site visit no later than mid-July, we estimate the external review report by mid-August, 2019.

- Estimated date of institution's response to external review (within 30 days upon receipt of external reviewer report)

We expect to provide a response to the external review report within two weeks of receipt. For planning purposes, this would be sometime between mid-August and the beginning of September, 2019.

- Proposed date of the institutional governing board meeting the new academic program would be considered for approval

September 18, 2019

- Proposed date of the THEC meeting for the academic program to be considered for Commission approval. (*2019 Commission Meetings: January 25, 2019; May 17, 2019; July 25, 2019; and November 7, 2019*)

November 7, 2019

**CURRICULUM** - An adequately structured curriculum which meets the stated objectives of the academic program, and reflects breadth, depth, theory and practice appropriate to the discipline and the level of the degree. The curriculum should be compatible with disciplinary accreditation, where applicable, and meet the criteria for the general education core as well as articulation and transfer.

**Program Learning Outcomes:** The proposed curriculum is designed to provide the data science student opportunities to gain experience with multiple sub-disciplines within the field of data science. At the completion of the program of study

- Students will be competent computer programmers and will be familiar with more than one computer programming language.
- Students will understand the mathematical and statistical background underpinning the work of a data scientist.
- Students will have experience constructing and using databases.
- Students will be familiar with the main concepts of machine learning and its application to data.
- Students will have experience with data management.
- Students will have experience modeling solutions based on data.

- Students will have experience with business intelligence tools that aid in the presentation of data.
- Students will be familiar with an ethical framework for the use of data to address important questions

**Program Requirements** – *Include the minimum number of SCH overall, required curriculum, (course prefix and number, title, SCH) and any special requirements including theses, internships.*

<b>General Education: 41 credits</b> <b>Data Science Major: 40 credits</b>		
MATH 1530*, MATH 2050, or BIA 2610	Statistics	3 credits
MATH 1910*	Calculus I	4 credits
MATH 2110	Data Analysis (R programming)	1 credit
MATH 2530	Applied Statistics II	3 credits
BIA 3620/3621	Introduction to Business Analytics	3 credits
INFS 4790	Database Design and Development	3 credits
CSCI 1170	Computer Science I	4 credits
CSCI 2170	Computer Science II	4 credits
ECON 2410*	Principles of Economics, Macroeconomics	3 credits
DATA 1500	Introduction to Data Science	3 credits
DATA 3500**	Data Cleansing and Feature Engineering	3 credits
DATA 3550	Applied Predictive Modeling	3 credits
DATA 4950**	Data Science Capstone	3 credits
<b>Data Science Track: 24 credits</b>		
<b>Inferential Thinking Required Courses</b>	<b>Business Intelligence Required Courses</b>	<b>Machine Learning Required Courses</b>
MATH 2010 Elements of Linear Algebra	BIA 4010 Business Analytics and Visualization	CSCI 3080 Discrete Structures
STAT 4360 Regression Analysis	BIA/INFS 3470 Python for Business Applications	CSCI 3110 Algorithms and Data Structures
STAT 4380 Experimental Design	STAT 4700 Analysis of Large-Scale Data Sets	CSCI 4350 Introduction to Artificial Intelligence
STAT 4700 Analysis of Large-Scale Data Sets	INFS 4900 Business Data Communications	CSCI 4850 Neural Networks
<b>Data Science Track Electives:</b>		
<i>Students will complete Track requirements by selecting from the following or from courses in a different track</i>		
CSCI 3130	Assembly and Computer Organization	4 credits
CSCI 3240	Introduction to Computer Systems	3 credits
CSCI 4330	Parallel Processing Concepts	3 credits
ECON 2420	* Principles of Economics, Micro	3 credits
ECON 4620	Econometrics and Forecasting	3 credits
STAT 4600 OR ACSI 4600	Problems in Statistics or Problems in Actuarial Science <sup>A</sup>	3 credits
CSCI 4300 -	Data Communication and Networks	3 credits
DATA 4500	Data Science Internship <sup>A, **</sup>	3 credits
<b>Electives (A minor is strongly encouraged)</b>		<b>15 credits<sup>B</sup></b>
<b>TOTAL</b>		<b>120 credits</b>

\* This course also meets General Education requirements

\*\* New courses specifically for the Data Science program

<sup>A</sup> Classes are either internship or independent study courses, which vary based on the project or internship.

<sup>B</sup> Note: Students may have up to 21 elective hours if MATH 1910 and ECON 2410 are taken for Gen Ed. .

**Current Courses and Existing Programs-** *List current courses and existing institutional programs which will give strength to the proposed program.*

All of the courses listed in the curriculum with MATH, CSCI, ECON, INFS, and BIA prefixes already exist and are offered regularly at MTSU.

**New Courses Needed-** *List any new courses which must be added to initiate the program; include a catalog description for each of these courses.*

The only new courses needed are DATA 3500, DATA 4500, and DATA 4950. All of these courses cover ethics and emphasize the application of data science skills.

DATA 3500 – Data Cleansing and Feature Engineering, 3 credits – Prerequisite: CSCI 1170. An applied course in how to clean data sets and create features that make the analysis of the data easier.

DATA 4500 – Internship in Data Science, 3 credits – Prerequisite: Program Approval. Practical experience in data science.

DATA 4950 – Capstone in Data Science, 3 credits – Prerequisite: Senior Standing. A project-based course that requires the use of all the skills learned throughout the Data Science program.

**Distance Learning** – *Indicate whether this program will be offered via distance learning and which courses are available via distance learning.*

The Data Science major is not being proposed as an online degree program. However, some courses may offer online sections. Depending on growth and demand, the major may consider offering courses via distance learning in the future.

**Course Syllabi:** Syllabi for existing courses are provided in Appendix F.

**ACADEMIC STANDARDS** – The admission, retention and graduation standards should be clearly stated, be compatible with institutional or governing board policy, and encourage high quality.

All Data Science majors must meet the established admission, retention, and graduation requirements of the university. There are no specific or unique admission, retention, or graduation requirements beyond those of the university.

Requirements for admission are found at:

[http://catalog.mtsu.edu/content.php?catoid=23&navoid=4174#Requirements\\_for\\_Admission](http://catalog.mtsu.edu/content.php?catoid=23&navoid=4174#Requirements_for_Admission).

Policies governing academic performance requirements and retention standards are found at:

[http://catalog.mtsu.edu/content.php?catoid=23&navoid=4176#Academic\\_Regulations](http://catalog.mtsu.edu/content.php?catoid=23&navoid=4176#Academic_Regulations).

Undergraduate degree requirements can be found at:

<http://catalog.mtsu.edu/content.php?catoid=23&navoid=4169>.

**EQUITY** – Provide information regarding how the proposed program will serve a diverse population of students (e.g., adult learners, students working and unable to relocate, students with preference for various delivery modes) or an underserved, historically underrepresented population of students or international students.

The interdisciplinary nature of this program will attract students who are interested in technology as well as those who are interested in the story-telling aspect of working with data. Through targeted recruitment, including our established “True Blue” recruiting tours in Memphis, Chattanooga, and Nashville, we will engage first generation, minority, and Pell-eligible students. Just as important as the initial recruitment of a diverse student populations is retention and persistence of students once enrolled. We have established programs such as the Scholars Academy and S.T.A.R. (Student Transition and Academic Readiness) that while open to all students, have an emphasis on first generation and/or Pell-eligible students with these specific objectives.

The proposed major will also provide educational opportunities for adult learners and/or working students who seek employment and/or advancement in the data science industry. The Data Science program will provide opportunities for students to attend full-time and part-time. Finally, we will work closely with the MTSU Veterans and Military Families Center to identify veterans whose career goals align with the Data Science degree.

**PROGRAM ENROLLMENT AND GRADUATES** – Provide the projected number of declared majors and graduates expected over the first three years (associate and certificate), 5 years (baccalaureate and master’s programs) or 7 years (doctoral programs).

We assume a fall 2020 start for this program and use a conservative estimate of enrollment. Full-time enrollment is figured at 12 credits per semester and part-time enrollment is figured at 6 credits per semester with enrollment in fall and spring terms although many students will also enroll during summers. (Sample programs of study for full-time and part-time students are included as Appendix B). We also incorporate a 10 percent yearly attrition rate after the first year.

Year	Full-Time Headcount	Part-time Headcount	Total Year Headcount	FTE	Graduates
1	25	4	29	27	0
2	43	4	47	45	0
3	50	6	56	53	4
4	58	6	64	61	9
5	65	8	73	69	14

**ADMINISTRATIVE STRUCTURE** – Provide the administrative unit and program director that will be responsible to ensure success of the proposed program.

The Data Science Undergraduate program will be an interdisciplinary program including faculty from the College of Business and the College of Basic and Applied Sciences. It will be housed in the College of Basic and Applied Sciences and will report directly to the Dean of that college. There will be a director and an administrative assistant. Faculty will remain part of their home departments / colleges while teaching courses in this program. New faculty employed with instructional duties in the Data Sciences major will be appointed in an academic department such as Information Systems & Analytics, Computer Science, Mathematics, or Economics & Finance. Instructional assignments will be developed in coordination with participating faculty members' home departments and will be part of their regular instructional workload.

Data Sciences Coordinating Committee. Primary responsibility for oversight and ongoing management of the program lies with the Data Science Coordinating Committee (DSCC). In addition to the Program Director, and a representative from the Data Science Institute, the committee will be composed of one faculty member each from the departments of Mathematics, Computer Science, Information Systems and Analytics, and Economics and Finance. While the program director will be appointed by the Dean, the individual department representatives will be appointed by their respective department chairs from individuals active in the program. In collaboration with the dean, this committee is responsible for selecting and appointing participating faculty members and for ensuring the coherence of (and adherence to) the program's curriculum and research activities. The Program Director of the Data Sciences program serves as chair of the Data Sciences Coordinating Committee. This arrangement is similar to the administrative structure of our other highly successful interdisciplinary programs (e.g., Computational Science, Molecular Biosciences, Math & Science Education, etc.)

The Data Science undergraduate program will also be a complement to the Data Science Institute, which gives faculty and students an opportunity to conduct research and work with external organizations on big data projects. An undergraduate program at MTSU in Data Science is a logical step to continue to promote data on campus and will work closely with the Data Science Institute to infuse research and projects into the curriculum.

**FACULTY RESOURCES** - Current and/or anticipated faculty resources should ensure a program of high quality. The number and qualification of faculty should meet existing institutional standards and should be consistent with external standards, where appropriate. The adequacy of the number of faculty should be paramount in the planning process as institutions build increasing numbers of interdisciplinary and cross-disciplinary academic programs. The student/faculty ratio for the proposed program should be included in the documentation.

**Current Faculty** – *List the name, rank, highest degree, primary department and estimate of the level of involvement of all current faculty members who will participate in the program. If the proposed program is at the graduate level, designate current graduate faculty status in relation to eligibility to chair thesis and/or dissertation. Attach a three page vita for each faculty member listed including relevant related activities for the past five years.*

NAME	RANK	HIGHEST ACADEMIC DEGREE	DEPARTMENT	% in PROGRAM
Lisa Green	Associate Professor	Ph.D., Georgia Institute of Technology	Interim Chair, Mathematical Sciences	40%
Don Hong	Professor	Ph.D., Texas A&M University, College Station	Mathematical Sciences	10%
Yeqian Liu	Assistant Professor	Ph.D., University of Missouri	Mathematical Sciences	10%
Qiang Wu	Associate Professor	Ph.D., City University of Hong Kong	Mathematical Sciences	10%
Lu Xiong	Assistant Professor	Ph.D., Middle Tennessee State University	Mathematical Sciences	10%
Charlie Apigian	Professor	Ph.D., University of Toledo, OH	Director of the Data Science Institute, Information Systems and Analytics	20%
Stoney Brooks	Assistant Professor	Ph.D., Washington State University	Information Systems and Analytics	10%
Scott Seipel	Associate Professor	Ph.D., University of Texas, Arlington	Information Systems and Analytics	10%
Keith Gamble	Professor	Ph.D., University of California, Berkeley	Chair, Economics and Finance	10%
Joshua Phillips	Assistant Professor	Ph.D., University of California, Merced	Computer Science	20%
Zhijiang Dong	Professor	Ph.D., Florida International University	Computer Science	10%
Ferrol Aderholdt	Assistant Professor	Ph.D., Tennessee Technological University	Computer Science	10%
New Hire	Assist/Assoc Professor		TBD	80%
New Hire	Assist/Assoc Professor		TBD	80%
New Hire	Assist/Assoc Professor		TBD	80%

**Anticipated Faculty** - *Describe the additional faculty needed during the next five years for the initiation of the program and list the anticipated schedule for addition of these faculty members.*

MTSU will conduct a “cluster hire” of three tenure-track faculty members during the planning year with the objective of starting the program with a critical mass of faculty with expertise in data science. The department of appointment will negotiated and will be based upon academic preparation and or research focus of the appointee. By using a cluster hire approach we will make a statement about our intent to establish a premier data science program. We believe the opportunity to join a collaborative program launch and affiliate with the Data Science Institute will attract significant interest among potential applicants. All three lines are budgeted (see attachment A) and include a 3% inflation factor.

One line is funded with new dollars and two from existing, vacant lines, reallocated from existing university resources. In year five, we will hire an additional full-time instructor. In addition, the program will utilize adjunct faculty to teach in specialized areas. These expenses (\$2,100 per course) are included in the budget but do not carry an inflation factor.

**LIBRARY AND INFORMATION TECHNOLOGY RESOURCES** – Provide documentation to demonstrate adequate current and/or anticipated library and information technology resources to support a high quality program which meets recognized standards for study at a particular level or in a particular field.

**Library and Information Technology Acquisitions Needed** - *Describe additional library and information technology acquisitions needed during the first three years (associate and certificate), 5 years (undergraduate and master's programs) or 7 years (doctoral programs) for the successful initiation of the program.*

Because we already offer most of the courses that are included in this degree, we require minimal additional resources to support this program. Attachment A includes funds to support additional library resources (Recurring Expenses, Other).

**SUPPORT RESOURCES** - Provide documentation to demonstrate adequate other existing and/or anticipated support resources including clear statements of support staff, student advising resources, arrangement for clinical or other affiliations, and professional development for faculty necessary for a successful program.

**Evidence of willingness to partner** - *Include government, education, health and business entities.*

We have received overwhelming support from local, regional, and statewide organizations as we initiated planning for this degree. We provided seven (7) letters of support at the time we submitted our initial Letter of Notification. These provide evidence of willingness on the part of business and industry to partner and are included as Appendix D.

**Other Support Currently Available** - *Include support staff, university and non-university assistance.*

We have budgeted for a one course reassignment every semester plus summer credit of 3 hours to provide adequate time for the program director to carry out administrative duties. This increases to a two-course reassignment beginning in year two. (See Attachment A - Recurring Expenditures, Administration)

The College of Basic and Applied Sciences employs professional advisors who provide academic advising and the University Office of Student Success is nationally recognized for its focus on student success.

**Other Support Needed** -- *List additional staff and other assistance needed during the first three years (associate and certificate), 5 years (baccalaureate and master's programs) or 7 years (doctoral programs).*

An administrative assistant is required to help with scheduling courses, communicating with prospective students, and other administrative duties as needed. This position is budgeted for in

attachment A at \$32,000 + \$9600 in benefits, with a 3% increase per year. (See Recurring Expenditures, Support Staff)

**FACILITIES AND EQUIPMENT**- Provide documentation to demonstrate adequate existing and/or anticipated facilities and equipment. New/or renovated facilities required to implement the program should be clearly outlined by amount and type of space, costs identified and source of funds to cover costs.

**Existing Facilities and Equipment** - *Assess the adequacy of the existing physical facilities and equipment available to the proposed program. Include special classrooms, laboratories, physical equipment, computer facilities, etc.*

MTSU has among the largest, if not the largest, undergraduate Computer Science program among all Tennessee Public Universities (482 majors in fall 2018). This program is housed on the third floor of Kirksy Old Main, just above the Department of Mathematics and Statistics. It is supported by extensive smart classrooms and a large university computer lab dedicated to computer sciences. All computers are on the university's update / replace rotation schedule. We anticipate locating the Data Science program in space adjacent to the Computer Science department and labs which will become available with the completion of two new instructional buildings in summer/fall 2020.

**Additional Facilities and Equipment Required or Anticipated** - *Describe physical facilities and equipment that will be required/anticipated during the first three years (associate or certificate programs), 5 years (undergraduate and master's programs) or 7 years (doctoral programs).*

The space described above includes existing classrooms, a computer lab and faculty office spaces, including for a program office, which are adequate to implement this proposed degree program and no additional laboratory or space needs are required.

We have budgeted for office furnishings and computer equipment for the director and executive aide, as well as the new faculty hires (See Attachment A – One-time Expenditures, Equipment). No additional facilities or equipment will be required nor do we anticipate a need in the future.

**MARKETING AND RECRUITMENT PLAN** – Provide a plan, including marketing and recruitment, to ensure all prospective students will have equitable access to the program so as not to impede the state's commitment to diversity and access in higher education. Identify any budget implications in the THEC Financial Projection Form.

The B.S. in Data Science will be implemented in fall 2020 and will be subject to post-approval monitoring for the first five years of operation. The university's assessment of program viability (the basis for the decision to seek approval to implement a new degree) is based upon a projection of enrollment sufficient to offset program costs. With these targets and the requirements of the post-approval monitoring process in mind, it is critical that MTSU develop and carryout a comprehensive strategic plan for recruitment of students to this major. The MTSU Strategic Recruitment Plan for the B.S. in Data Science is provided in Appendix C. Attachment A includes funds in the Planning Year to support initial program promotion and recruitment (See One-time Expenditures, Other).

**ASSESSMENT/EVALUATION -** Although the primary responsibility for program quality rests with the institution and its institutional governing board or its system, THEC considers pertinent information to verify that high standards have been established for the operation and Evaluation of the programs. Evidence must be proposed to demonstrate that careful evaluation is undertaken periodically throughout the lifetime of the program indicating:

**The schedule for program assessments or evaluations, (including program evaluations associated with Quality Assurance, institutional program review, student evaluations, faculty review, accreditation, and employer evaluation),**

The Data Science major will conduct regular scheduled external reviews of this program in accordance with university and THEC policies. The office of Institutional Effectiveness, Planning, and Research is responsible for overseeing external program reviews. The Data Science degree program will utilize both formative and summative evaluation to assess the extent to which the program is meeting institutional goals and objectives. The University, the College of Basic and Applied Sciences place instructional and program quality among their highest priorities and will assess both on an ongoing basis.

- We will establish an advisory board consisting of key professionals in the Data Science Industry for the purpose of advising on trends, employee/employer needs, and curriculum.
- Students' perceptions of instructional quality will be measured through the use of student instructional evaluations in all data science courses each semester.
- Graduating seniors will also complete the "Graduating Senior Survey" encompassing all aspects of their educational experience at MTSU as well as a Major Field Test to measure content knowledge, retention, and areas that need improvement within the curriculum.
- Employment of graduates in appropriate business and industry settings is the ultimate goal of the program and is the final metric upon which program success may be measured. Placement data for new graduates and alumni will be tracked and analyzed to identify program strengths as well as opportunities for expanded placement efforts

**Responsible parties for conducting program assessments or evaluations, and accreditation.**

The Data Science undergraduate program director will be responsible for conducting program assessments/evaluations and accreditation.

**A plan for how results will inform the program post-approval.**

- The Advisory Board will be used to adjust curriculum to meet industry standards/trends and employer/employee needs.
- Student recruitment, retention, and graduation will be monitored by the director.
- The graduating senior exit evaluation and major field test will be used to adjust curriculum.

**ACCREDITATION** - Where appropriate, professional disciplinary accreditation organizations should be identified. The proposed accreditation timeline must be submitted. Any substantive change that may require a SACS-COC review should be indicated.

The university is accredited by the Southern Association of Colleges and Schools Commission on Colleges. The implementation of this major does not comprise a substantive change requiring SACSCOC review.

**FUNDING** –A budget narrative that complements the budget projections on the THEC Financial Projection Form should be included. The narrative must address the institution’s capacity to deliver the proposed program within existing and projected resources including an explanation of the current departmental budget in which the proposed program will be housed and estimated additional costs for the first three years (associate degrees, five years (undergraduate and master’s degrees), or seven years (doctoral degrees ) for the proposed program. Please note that these costs for each year are incremental costs not cumulative costs. Include all accreditation costs and proposed external consultations as related to accreditation. Identify any grants or gifts which have been awarded or anticipated.

THEC Financial Projection form is provided as Attachment A.

It should be noted that the attached THEC form has been modified to include a “planning year” as acknowledgment that some expenses of a new program (e.g., student recruitment) are incurred prior to year one of the program and are funded through institutional reallocation.

Beginning in year one, all expenses with the exception of the three tenure-track faculty positions are covered by tuition and fee revenue. Of these three faculty positions, one is a new position and is funded through tuition and fee revenue generated by this program. The other two are reallocations of existing lines in participating departments within the College of Basic and Applied Sciences and the College of Business, allowing us to recruit for a “cluster-hire” of faculty with expertise in data science. One-time expenses, in year one and five, are limited to purchase of computers and related technology for the new faculty and staff hires.

Recurring expenditures beginning in year one include funds to

- Support course reassignment and summer stipends for the program director (see Personnel, Administration, salary).
- Employ three new full-time tenure-track faculty in year one, and a full-time instructor in year four (see Personnel, Faculty, Salary & Benefits).
- Employ a new executive aide beginning in year one (see Personnel, Support Staff, Salaries and Benefits).
- Support travel related to student recruitment, professional development, and outreach to industry partners (See Operating, Travel)
- Printing of course and program materials

- Cover direct program expenses such as course materials, library resources, etc.

Recurring expenses generally include a 3% annual inflation factor.

Lastly, tuition and fees as well as state funding are not differentiated based upon cost of instruction although instructional costs vary across programs (i.e., although student tuition rates and Tennessee's outcomes-based funding formula do not recognize it, there are greater costs associated with some academic programs, such as Nursing, Aerospace, and Engineering than in other programs such as Education, English, or Tourism and Hospitality Management). Therefore, if tuition revenues exceed direct and indirect expenses for one academic program they may be used to offset direct and indirect instructional expenses of other academic programs.

**Tennessee Higher Education Commission**  
**Attachment A: THEC Financial Projections**  
**Middle Tennessee State University**  
**B.S. in Data Science**

Seven-year projections are required for doctoral programs.

Five-year projections are required for baccalaureate and Master's degree programs

Three-year projections are required for associate degrees and undergraduate certificates.

Projections should include cost of living increases per year.

	<b>Planning Year</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>I. Expenditures</b>						
<b>A. One-time Expenditures</b>						
New/Renovated Space		\$ -	\$ -	\$ -	\$ -	\$ -
Equipment			20,000		-	5,000
Library	\$ -					
Consultants						
Travel	\$ -					
Other	\$ 10,000					
<b>Sub-Total One-time</b>	<b>\$ 10,000</b>	<b>\$ 20,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 5,000</b>
<b>B. Recurring Expenditures</b>						
<b>Personnel</b>						
<b>Administration</b>						
Salary		\$ 14,200	\$ 18,400	\$ 18,400	\$ 18,400	\$ 18,400
Benefits						
<b>Sub-Total Administration</b>	<b>\$ 14,200</b>	<b>\$ 18,400</b>				
<b>Faculty</b>						
Salary		\$ 381,000	\$ 391,800	\$ 411,324	\$ 422,782	\$ 483,583
Benefits		108,000	111,240	114,577	118,015	142,555
<b>Sub-Total Faculty</b>	<b>\$ 489,000</b>	<b>\$ 503,040</b>	<b>\$ 525,901</b>	<b>\$ 540,796</b>	<b>\$ 626,138</b>	
<b>Support Staff</b>						
Salary		\$ 32,000	\$ 32,960	\$ 33,949	\$ 34,967	\$ 36,016
Benefits		\$ 9,600	\$ 9,888	\$ 10,185	\$ 10,490	\$ 10,805
<b>Sub-Total Support Staff</b>	<b>\$ 41,600</b>	<b>\$ 42,848</b>	<b>\$ 44,133</b>	<b>\$ 45,457</b>	<b>\$ 46,821</b>	
<b>Graduate Assistants</b>						
Salary						
Benefits		-	-	-	-	-
Tuition and Fees* (See Below)		-	-	-	-	-
<b>Sub-Total Graduate Assistants</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Operating</b>						
Travel		\$ 5,000	\$ 7,500	\$ 7,500	\$ 10,000	\$ 10,000
Printing		750	750	1,000	1,000	1,000
Equipment						
Other		10,000	11,000	14,500	15,000	15,000
<b>Sub-Total Operating</b>	<b>\$ 15,750</b>	<b>\$ 19,250</b>	<b>\$ 23,000</b>	<b>\$ 26,000</b>	<b>\$ 26,000</b>	
<b>Total Recurring</b>	<b>\$ 560,550</b>	<b>\$ 583,538</b>	<b>\$ 611,435</b>	<b>\$ 630,654</b>	<b>\$ 717,359</b>	
<b>TOTAL EXPENDITURES (A + B)</b>	<b>\$ 10,000</b>	<b>\$ 580,550</b>	<b>\$ 583,538</b>	<b>\$ 611,435</b>	<b>\$ 630,654</b>	<b>\$ 722,359</b>

**\*If tuition and fees for Graduate Assistants are included, please provide the following information.**

Base Tuition and Fees Rate

Number of Graduate Assistants

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>II. Revenue</b>						
Tuition and Fees <sup>1</sup>		\$ 254,016.00	\$ 436,320.00	\$ 527,880.00	\$ 625,128.00	\$ 728,640.00
Institutional Reallocations <sup>2</sup>	\$ 10,000.00	\$ 326,534.00	\$ 147,218.00	\$ 83,554.64	\$ 5,525.68	\$ (6,280.83)
Federal Grants <sup>3</sup>		0	0	0	0	0
Private Grants or Gifts <sup>4</sup>		0	0	0	0	0
Other <sup>5</sup>		0	0	0	0	0
<b>BALANCED BUDGET LINE</b>	<b>\$ 10,000.00</b>	<b>\$ 580,550.00</b>	<b>\$ 583,538.00</b>	<b>\$ 611,434.64</b>	<b>\$ 630,653.68</b>	<b>\$ 722,359.17</b>

**Notes:**

**(1) In what year is tuition and fee revenue expected to be generated and explain any differential fees. Tuition and fees include maintenance fees, out-of-state tuition, and any applicable earmarked fees for the program.**

Year 1 (2019) tuition is estimated at \$392 per credit hour. Tuition in subsequent years has a 3% inflation factor.

Year 1: 25 students x 12 hours x 2 semesters x \$392 = \$235,200 + 4 students x 6 credits x 2 semesters x \$392 = \$18,816 (Total = \$254,016)

Year 2: 43 students x 12 hours x 2 semesters x \$404 = \$416,928 + 4 students x 6 credits x 2 semesters x \$404 = \$19,392 (Total = \$436,320).

Year 3: 50 students x 12 hours x 2 semesters x \$415 = \$498,000 + 6 students x 6 credits x 2 semesters x \$415 = \$29,880 (Total = \$527,880).

Year 4: 58 students x 12 hours x 2 semesters x \$427 = \$594,384 + 6 students x 6 credits x 2 semesters x \$427 = \$30,744 (Total = \$625,128).

Year 5: 65 students x 12 hours x 2 semesters x \$440 = \$686,400 + 8 students x 6 credits x 2 semesters x \$440 = \$42,240 (Total = \$730,296).

**(2) Please identify the source(s) of the institutional reallocations, and grant matching requirements if applicable.**

One-time expenses in the planning year will be covered through reallocation within Academic Affairs.

Institutional Reallocations in years 2-4 are attributed to the cluster hire of faculty in year one and are funded through transfer of existing faculty lines

**(3) Please provide the source(s) of the Federal Grant including the granting department and CFDA(Catalog of Federal Domestic Assistance) number.**

No Federal grants are used to fund this degree.

**(4) Please provide the name of the organization(s) or individual(s) providing grant(s) or gift(s).**

No external grants or gifts are used to fund this degree.

**(5) Please provide information regarding other sources of the funding.**

With the exception of the planning year, this degree is funded entirely through tuition revenue.

NOTE: One-time expenses (Other) includes costs associated with program implementation (e.g., promotion/advertising expenses)

One-time Equipment expenses are for the purchase of computers/equipment for new admin and faculty hires

Recurring expenses (Other) are for direct expenses (e.g. instructional materials, faculty development, and promotion).

**Administration Personnel**

Administration Salary in Years 1 - 5 are for a Program Director - for reassigned time in the Fall and Spring and stipend (\$10,000) in the Summer  
Faculty Personnel (Full-time faculty costs include a 3% annual increase in salary while adjunct costs are fixed.)

Year 1: 3 new Tenure-Track Faculty Members & 10 courses (\$21,000) by adjuncts for Math, Computer Science, and/or Info. Systems & Analytics.

Year 2 continues 3 Tenure-Track lines from Year 1 and 10 courses (\$21,000) by adjuncts for Math, Comp. Science, and/or Info. Sys. & Analytics.

Year 3 continues 3 Tenure-Track lines plus 14 courses (\$29,400) covered with adjuncts for Math, Comp. Science, and/or Info. Sys. & Analytics.

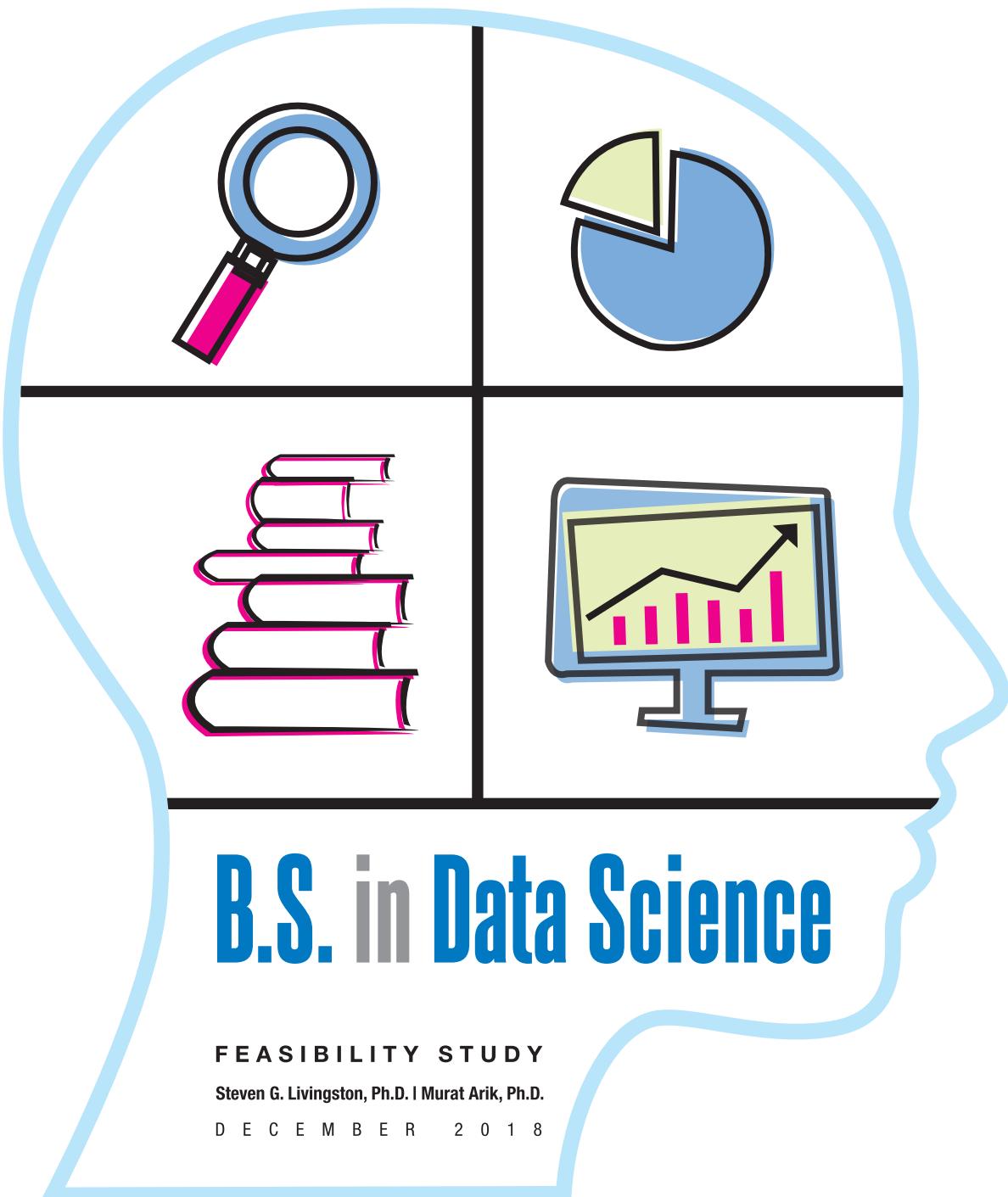
Year 4 continues 3 Tenure-Track lines plus 14 courses (\$29,400) covered with adjuncts for Math, Comp. Science, and/or Info. Sys. & Analytics.

Year 5 adds 1 new Full-time Instructor to the existing full-time lines with a reduction to 4 courses (\$8,400) covered by adjuncts.

**Support Staff Personnel (each year includes a 3% increase in salary)**

Support Salary in Years 1 through 5 for (1) Executive Aide for the program.

NOTE: Tuition revenue in excess of direct & indirect program costs is included in Institutional Reallocation to support other programs.



# B.S. in Data Science

## FEASIBILITY STUDY

Steven G. Livingston, Ph.D. | Murat Arik, Ph.D.

D E C E M B E R   2 0 1 8

**MIDDLE  
TENNESSEE**  
STATE UNIVERSITY

JONES COLLEGE OF BUSINESS  
*Business and Economic Research Center*

We evaluate the feasibility of offering a bachelors degree in Data Sciences at MTSU. We look at student demand to enter such a program, and then at the employment prospects for those leaving with a degree.

**Preliminaries** Data Science is a very new field of study. The NSF defines it as “the science of planning for, acquisition, management, analysis of, and inference from data.”<sup>1</sup> Depending upon the source, the term dates from only 2008 or 2001. The first undergraduate degree program in data science (at the College of Charleston) only began in 2013. Almost all bachelors programs in the U.S. have been founded within the past three years. The newness of the programs means that the name for this major has not been standardized across colleges and universities, though increasingly it appears that it will eventually converge on “Data Science.” However, thanks to the influence of two documents, the PCMI Undergraduate Programs in Data Science and a joint report of the National Academies of Science, Engineering, and Medicine, the curricula of these new majors are very similar.<sup>2</sup> The proposed MTSU major conforms to the recommendations of these documents as well as to the structure of other data science programs that have recently been initiated elsewhere.

The newness of the major, and indeed the occupation, means that the National Center for Education Statistics has not established a CIP code for it. By the same token, the Department of Labor does not have an SOC code for data scientists. At different colleges and universities, the same basic program has been associated with different CIP codes. For that reason, this report will at times aggregate data across all CIP codes that have been identified as “data science” at these different institutions.<sup>3</sup>

## Student Interest

We assess student interest in a data sciences program using several measures. We first look at the trend in the number of bachelor degrees awarded in the fields most

---

<sup>1</sup>Draft Report of the SNSF Committee. 2014. *Data Science at NSF*. <https://www.nsf.gov/attachments/130849/public/Stodden-StatsNSF.pdf>

<sup>2</sup>*Interim Report of the Committee on Envisioning the Data Science Discipline: The Undergraduate Perspective*. 2018. Consensus Study Report of the National Academies of Science, Engineering and Medicine, (Washington),<https://www.nap.edu/read/24886/chapter/1>, and Park City Math Institute Undergraduate Faculty Group. 2017. “Curriculum Guidelines for Undergraduate Programs in Data Sciences,” *Annual Review of Statistics* (4).

<sup>3</sup>Please see appendix I for a list of these CIP codes.

Figure 1: Trend in Degrees Awarded



Compiled from the National Center for Education Statistics, <https://ncesdata.nsf.gov/webcaspar/>.

similar to it. Then, we examine the trend in the number of data science programs and majors. Finally, we make use of a survey delivered to MTSU students to evaluate campus interest in this proposal.

### National Degree Trends

As noted in our preliminaries, “data science” is new enough that the number of undergraduate degrees being awarded in it is not yet being tracked. We thus make use of the degrees being awarded in the broader disciplines that include data sciences. These broader disciplines we define as those of the NCED CIP codes under which data science programs are currently identifying themselves. Figure 1 shows the trend in degrees awarded in the combined seven CIP codes used by almost all data science programs. 2015 is the last year for which data is available. The second line on Figure 1 tracks specifically CIP code 11.08.02, “Data Modeling/Warehousing and Database Administration,” the code chosen for the MTSU Data Sciences program.

As is evident, the trend line is positive.<sup>4</sup>

<sup>4</sup>The seeming “stall” in Data Modeling/Warehousing is likely due to the creation of two new codes, 11.10.05 and 11.01.04, in 2010. These shifted the distribution of degree counts within the larger CIP 11.00.00 code.

## **Experience of Majors at other Institutions**

The number of degree programs in data sciences is growing rather dramatically.<sup>5</sup> So fast, in fact, that an accurate count is very difficult. The website “datascience community” lists forty-three bachelors programs in data science.<sup>6</sup> However we know of a number of institutions that are not on its list, so the true number is higher. The very first of these programs dates only from 2013. So even using forty-three as a reliable number, the speed with which data science programs are being initiated is astounding, closing in on ten a year.

Currently, in Tennessee the only data science B.S. program is at Lipscomb University. Tennessee Tech and the University of Tennessee at Chattanooga offer concentrations in data science through programs in their engineering colleges. T.S.U. offers a concentration in “business data analytics” which has some overlap with a data science program. Maryville College and Western Kentucky offer degrees in Business Analytics. The primary difference between business analytics and a data science program is the former’s inclusion of “classic” business skills such as accounting vs. the latter’s greater emphasis on data management, big data, and software/programming skills.

Because no university program in the U.S. has existed for more than six years, comprehensive information on the popularity of these programs is scant. So we proxied for this in two ways. Figure 2 shows the enrollment pattern at the College of Charleston, the first university program. The bottom line of the College of Charleston chart shows the actual number of full-time student majors from 2013 to 2018. The program has grown from 29 majors in its first year to 41 majors this year. Because it is a much smaller school than MTSU, the top dashed line shows the number of full-time MTSU majors that would be expected if it tracked Charleston’s path. The expectation from Charleston’s experience would be 70 MTSU majors at year five of the program.

Almost all other programs are less than four years old. Most are just one or two years old. We took available data from eight programs—essentially all that we could find—to create the second chart in Figure 2. It shows the mean and median enrollments of these eight programs in their first, second, and third years.<sup>7</sup> We also show the minimum enrollment in any of these programs. Again, because these schools have variously sized student populations, we have normed the numbers to express the number of majors in terms of MTSU’s student body. The chart shows a steady rise in majors over the first three years of a program, the median increases from 11 to 34 over that time frame. None of the programs we examined saw a fall in majors after the first or second years.

We might also look at the enrollment expectations of other new programs at institutions broadly similar to MTSU. Iowa State University commenced its Data Science major this fall. In its program proposal it estimated a first year population of 15 with the number of majors rising to 40 by year six.<sup>8</sup> The University of North Carolina/Charlotte

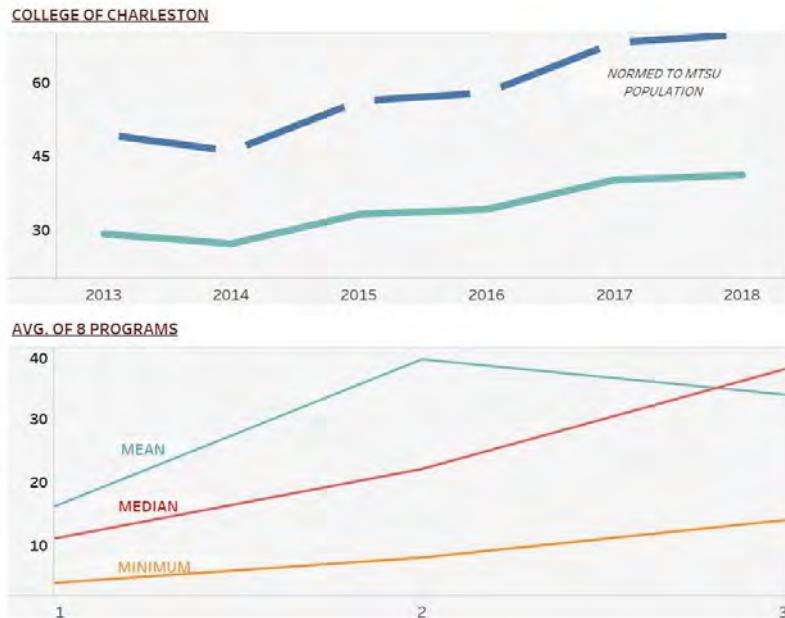
<sup>5</sup>See Emily Tate. 2017. “Data Analytic Programs Take Off,” *Insidehighered.com*. <https://www.insidehighered.com/digital-learning/article/2017/03/15/data-analytics-programs-taking-colleges>

<sup>6</sup><http://datascience.community/colleges>. Accessed November 29, 2018.

<sup>7</sup>The institutions are shown in Appendix II. We excluded several elite programs, Yale, the University of Michigan, and the University of California at Berkeley because of their very different student make-up.

<sup>8</sup><http://www.facsen.iastate.edu/sites/default/files/uploads/17-18%20Docket%20Calendar/S17-6%20->

Figure 2: Trend in Majors for 9 programs with Data



Compiled from enrollment dashboards of institutions identified in Appendix II.

will begin its major in the fall of 2019. In its letter of intent, though it does not estimate a specific number, it concludes “student demand for the proposed BS in Data Science will be robust.”<sup>9</sup>

A final metric that we might use is the experience of similar Masters programs. There are a number of Business Analytics masters programs that have been established recently. (We noted above that at the undergraduate level business analytics shares commonalities with Data Sciences, though they are not the same thing.) The UNC/Charlotte document cited above notes that its masters programs has reached enrollment capacity five years after it was inaugurated. MTSU’s Business Intelligence and Analytics program was launched in 2015. Since then its enrollment has risen from two to twenty-seven graduate students. The increasing demand for masters degrees in this subject supports the sense that this is field of study in the midst of growing student interest.

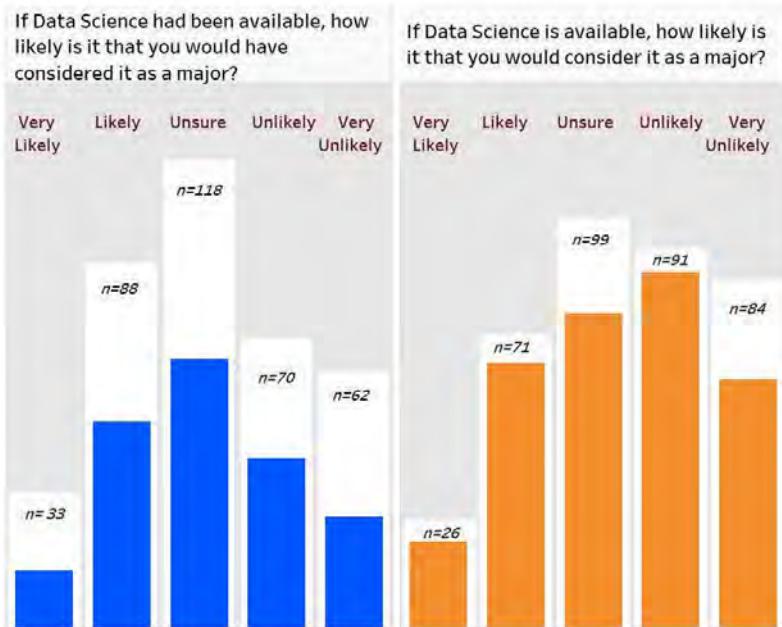
### MTSU Survey

In late October 2018 a survey of interest in Data Science was delivered to 371 MTSU undergraduates in computer science, engineering, information systems, and math/statistics courses. Students in thirty different majors responded to the survey, though of course

%20Data%20Science%20Major.pdf

<sup>9</sup><https://provost.uncc.edu/sites/provost.uncc.edu/files/media/LOI-Data-Science-BS.pdf>

Figure 3: Results of MTSU Survey



the majority were in these four areas. Students were asked how likely they would have considered majoring Data Science had the major existed when they began at MTSU and how likely they would now consider this major if were to be available. The students were also asked to rank order their interest in Data Science topics, and to express an opinion about the importance of having a Data Science major at MTSU.

Figure 3 summarizes the key results. The bar chart on the left are the responses to the retrospective question: whether the student would have majored in Data Science had been available. The white bars are the total responses (with their number designed by "n"). Because a retrospective question would mostly pertain to students too advanced in their current major to contemplate changing it, we concentrate on juniors and seniors. The blue bars show their distribution. Sixty-four of these 208 students (31 percent) indicated they would have been "likely" or "very likely" to major in Data Science. For the prospective question, we again show full results. The orange bars exclude seniors. Twenty-eight percent (85/308) of those not yet seniors said they would be "likely" or "very likely" to major in Data Science.

Particularly striking are the 120 responses from students not currently majoring in computer science, engineering, information systems, or math/statistics. Ten of these students indicated they were "very likely" to become Data Science majors, and another 26 "likely." That is thirty percent of these respondents. This may be indicative of significant interest in this major outside its most closely cognate fields.

If but twenty percent of those surveyed that expressed a definite interest in the major followed through on their expression and not a single of MTSU's other 19,000

students opted to also major in Data Science, the first year of the program would have seventeen students, roughly the average of the first year of this major at other universities. However it is far more realistic to consider this the low estimate of first year majors. Thirty percent of non-closely cognate majors taking this survey indicated they would be likely or very likely to major in this subject. If but 1 out of 100 from this group across the campus feels similarly, that is 54 majors. To which, if we add our prior group, we would have 71 first year majors. We might consider this a medium to high estimate for the first year.

We have analyzed enrollment, and to the extent possible, degree trends in Data Science. The findings are consistent. The number of degrees awarded are rising. The number of majors are rising. The numbers of programs are rising. Student interest at MTSU appears to be substantial. There is every reason to expect a significant number of students to be attracted to, and to choose to major in, a Data Science program at MTSU. Acknowledging the difficulties of estimating a specific number, given the sparseness and brevity of the data we have, we have given what we think are realistic estimates of the initial size of the program.

## Employment Outlook

All the CIP Codes used to designate data science programs are designated STEM fields.<sup>10</sup> As is true of most STEM programs, demand for graduates is strong. The 2018 Jobs Rated Almanac lists “Data Scientist” as seventh best among 220 rated occupations, with a 19 percent projected growth in jobs through 2022.<sup>11</sup> Glassdoor, a large job recruiting site that similarly ranks occupations, lists “Data Scientist” first among its top fifty professions based upon job openings, salaries, and job satisfaction. 23,321 data scientist jobs were listed on its website during the month of November, 2018.<sup>12</sup> A more specific study jointly undertaken by IBM, the software consulting firm BurningGlass, and the Business Higher Education Forum, estimated a twenty-eight percent growth in Data Scientists between 2016 and 2020.<sup>13</sup> These projected growth rates far exceed the expected 7.4 percent increase in total American employment from 2016-2026. These sources agree that data science will be among the strongest growing occupations for some time. Indeed, an article in the Harvard Business Review was titled “Data Scientist: The Sexiest Job of the 21st Century.”<sup>14</sup>

We might note as a factor of interest that most of these jobs will not require graduate

<sup>10</sup>A list is available through US Immigration and Customs Enforcement, <https://www.ice.dhs.gov/sites/default/files/documents/Document/2016/stem-list.pdf>

<sup>11</sup>CareerCast, <https://www.careercast.com/jobs-rated/2018-best-jobs?page=6>. Accessed December 3, 2018.

<sup>12</sup>Glassdoor, [https://www.glassdoor.com/List/Best-Jobs-in-America-LST\\_KQ0,20.htm](https://www.glassdoor.com/List/Best-Jobs-in-America-LST_KQ0,20.htm). Accessed December 3, 2018.

<sup>13</sup>Will Markow, Soumya Braganza, Bledi Taska, *The Quant Crunch: How the Demand for Data Science Skills is Disrupting the Job Market*. 2017. <https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=IML14576USEN&>

<sup>14</sup>Thomas H. Davenport and D.J. Patil. 2012. *Harvard Business Review*. (October). <https://hbr.org/2012/10/data-scientist-the-sexiest-job-of-the-21st-century>.

Figure 4: Projected 2016-2026 Growth



*Data from BLS, Employment Projections. For Computers, “other” refers to occupations not specifically identified.*

degrees. The IBM study estimated that over sixty percent of jobs in this field will not need a masters degree or beyond.

## National Government Data

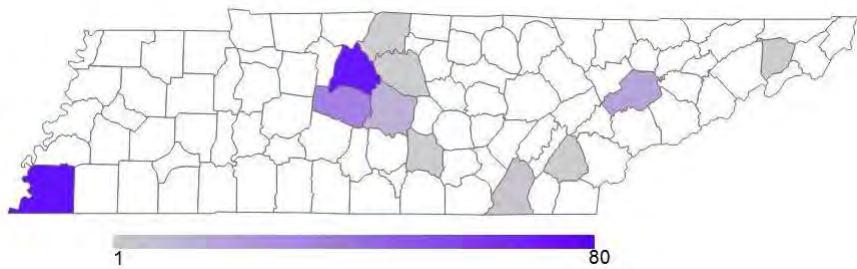
We are again a bit hobbled by the lack of an exact occupational code for data science. To get around this, we will use the Bureau of Labor Statistics SOC codes that correspond to the CIP codes used above. They are identified in Appendix III. The BLS estimates ten year growth in all these occupations to decidedly exceed overall employment growth between 2016-2026. It lists three of them among its top 30 fastest growing occupations over this period. This expectation is reinforced by the New York Federal Reserve Bank’s data on employment by college major.<sup>15</sup> It lists “Business Analytics” as having a current unemployment rate of 3.2 percent, significantly below the national rate of 4.1 percent. But it also estimates that this field has a lower than average “under-employment rate.” This refers to people that have a job, but a poorer job than one would expect given their educational background. Incidentally, the New York Fed notes that only twenty-four percent of employed business analytics have a graduate degree.

Another cut at this is to project employment from skill sets. O\*Net Online (a service of the Department of Labor) has compiled a list of “hot technologies.”<sup>16</sup> These are required skills that are found very frequently in job ads. The MTSU program would require learning Python, one of these hot technologies. A typical major would also acquire some set of statistical software (R or Stata), data visualisation (Tableau), and SQL. All of these are also listed as hot technologies.

<sup>15</sup>“Labor Market Outcomes of College Graduates by Major,” [https://www.newyorkfed.org/research/college-labor-market/college-labor-market\\_compare-majors.html](https://www.newyorkfed.org/research/college-labor-market/college-labor-market_compare-majors.html).

<sup>16</sup>[https://www.onetonline.org/search/hot\\_tech/#list\\_P](https://www.onetonline.org/search/hot_tech/#list_P)

Figure 5: Jobs by County



Compiled from job listings on jobs4tn website, accessed December 3, 2018.

## Tennessee Job Information

At the state level, both THEC and the Tennessee Department of Economic and Community Development project employment trends. The ECD lists thirteen of the eighteen occupations in SOC code 15 (Computer and Mathematical) as in “high employer demand in 1 or more regions.”<sup>17</sup> It also notes that STEM related employment in Tennessee will grow 1.5 times as fast as overall employment growth. THEC’s 2018 report on workforce needs similarly finds that employer demand outstrips supply in “Web/Multimedia Management, Programming,” cluster (code 11.34), the cluster into which it places most of our relevant CIP codes.<sup>18</sup> It estimates that annually 380 more positions are available in this cluster than there are applicants to fill them.

The state’s Department of Labor and Workforce Development identifies each of the SOC codes we are examining as having a “bright outlook statewide.”<sup>19</sup> As of December 2018, the Department showed 266 applicants for 309 positions in these occupations.

## Local Distribution

Figure 5 shows the regional distribution of the job openings known to the state. Not surprisingly, this is an occupation where employment is clustered in urban areas. The majority of these jobs are in the Nashville MSA. MTSU graduates would thus be well located to seek these jobs, and local employers would be advantaged by having a nearly program from which they could draw students in a very competitive employment environment.

<sup>17</sup>Center for Economic Research in Tennessee. *LEAP 2018 Occupational Analysis*. Tennessee Department of Economic and Community Development.

<sup>18</sup>*Academic Supply and Occupational Demand in Tennessee: Workforce Needs and Award Production*. 2018. Tennessee Higher Education Commission.

<https://www.tn.gov/content/dam/tn/thech/bureau/research/other-research/supply-demand/Academic%20Supply%20and%20Occupational%20Demand%20-%20Final.pdf>

<sup>19</sup>Jobs4tn website: <https://www.jobs4tn.gov/vosnet/analyzer/drill/drill.aspx?tab=code&session=occdetail&valueName=occupation>. Accessed December 3, 2018.

# **Conclusion**

The data is consistent across sources that data science is a rapidly growing field of study with equally growing employment. There is virtual unanimity that data science is increasingly important and that employment demand will continue to be very robust. We found no dissent from that general view. Nationally, and locally, there appears a need to train more students in the skills developed through data science programs. As of late 2018, Tennessee has very few programs that offer this training. Lipscomb University is the only institution of higher education that offers a bachelors in data science. Evident student interest, a consensus among experts that need and employment opportunities are strong, and the existing dearth of B.S. data science programs in this state all combine to suggest that an MTSU bachelors program in Data Science is needed and would be successful both in attracting students and placing them in desirable jobs.

## APPENDIX I

Following are the Classification of Instructional Programs (CIP) codes used in this study. Boldfaced is the code designated by MTSU.

<i>Code</i>	<i>Degree</i>
11.0104	Informatics
11.0401	Information Science/Studies
11.0501	Computer System Analysis/Analyst
<b>11.0802</b>	<b>Data Modeling/Warehousing and Database Administration</b>
27.0501	Statistics, General
27.0503	Mathematics and Statistics
30.3001	Computational Science

## APPENDIX II

These are the colleges and universities the data from which were used for Figure 2. Note that we added Tennessee Tech, which has only a concentration, and Western Kentucky, whose major is Business Data Analytics, because they provide our only source of regional data. An “x” means the data is not available.

<i>Institution</i>	<i>First Year</i>	<i>Year One Enrollment</i>	<i>Year Two Enrollment</i>	<i>Year Three Enrollment</i>
Charleston	2013	29	27	33
Tennessee Tech (concentration)	2016	3	9	24
University of Wisconsin/River Falls	2016	14	41	x
Western Kentucky (Business Data Analytics)	2016	19	49	x
University of Massachusetts/Dartmouth	2015	6	10	16
Western Michigan	2015	5	9	16
University of Minnesota/Winona	2015	9	13	x
University of Northern Kentucky	2013	x	x	23
Marquette	2017	14	20	x
Colorado State	2018	16	x	x

## APPENDIX III

Standard Occupational Classification Codes Used in this study:

<i>code</i>	<i>Title</i>	<i>detail</i>	<i>2016-26 Growth</i>	<i>Annual Openings</i>	
15-1141	Database Administrator		11.5%	9,300	“bright outlook”
15-1199	Computer Occupations (other)		9.3%	22,400	
15-1199.06		Database Architects			
15-1199.07		Data Warehousing Specialists			
15-1199.08		Business Intelligence Analysts			
15-2041	Statisticians		33.8%	4,400	“bright outlook”
15-2031	Operations Research Analysts		27.4%	10,700	“bright outlook”

# **Appendix B-1 Sample Program of Study (Full-Time)**

## **Bachelor of Science in Data Science - MTSU**

Major Core	40
Data Science Track	24
Elective (Minor)	15
General Ed	41
<b>TOTAL</b>	<b>120</b>

(\* Note: 3 credits of MATH 1910 count as Gen Ed and 1 credit counts toward the major)

**Appendix D-2**  
**Sample Program of Study (Part-Time)**  
**Bachelor of Science in Data Science - MTSU**

		<b>Year One</b>			<b>Year Two</b>			<b>Year Three</b>			<b>Year Four</b>				
Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring	Summer	
HIST 2010, 2020, 2030	MATH	Soc/Beh Sciences (Rubric 1)	Hum/Fine Arts (Rubric 1)	Hum/Fine Arts (Rubric 2)	Nat/Sci (Rubric 2)	Statistics	ENG 2020, 2030 or HUM 2610	CSCI 1170	CSCI 2170	DATA 3550	BIA 3620/3621				
3	3	3	3	3	4	4	3	4	4	3	3	4	3	3	
ENGL 1010	ENGL 1020	HIST 2010, 2020, 2030	Nat/Sci (Rubric 1)	COMM 2200	MATH 1910	ECON 2410	DATA 1500	Soc/Beh Sciences (Rubric 2)	DATA 3500	MATH 2530	DS Track				
												MATH 2110		1	
6	6	6	7	6	8	6	6	7	7	7	7	7	7	6	
		<b>Year Five</b>			<b>Year Six</b>			<b>Year Seven</b>							
Fall	Spring	Summer	Fall	Spring	Summer	Fall									
DS Elective	DS Track	DS Elective	INFS 4790	DS Track	DS Track	DATA 4950									
3	3	3	3	3	3	3									
Elective (Minor)	Elective (Minor)	Elective (Minor)	Elective (Minor)	Elective (Minor)	DS Track	DS Elective									
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
<b>Major Core</b>		<b>40</b>													
<b>Data Science Elective</b>		<b>24</b>													
<b>Minor &amp; Electives</b>		<b>15</b>													
<b>General Education</b>		<b>41</b>													
<b>TOTAL</b>		<b>120</b>													
							<b>TOTAL =</b>	<b>120</b>							

## APPENDIX C

### Student Recruitment Plan – B.S. in Data Science Major

The project implementation date for the B.S. in Data Science is fall 2020. In order to achieve the enrollment targets projected in the New Academic Program Proposal it is critical to launch a comprehensive student recruitment effort well ahead of the fall 2020 term.

#### Enrollment Targets

	Full-Time Headcount	Part-time Headcount	Total Headcount	Total FTE Headcount
Year 1: AY 2020-21	25	4	29	27
Year 2: AY 2021-22	43	4	47	45
Year 3: AY 2022-23	50	6	56	53
Year 4: AY 2023-24	58	6	64	61
Year 5: AY 2024-25	65	8	73	69

#### Time-Line with Recruiting Milestones

4/2019 – MTSU University Curriculum Committee approves degree

8/2019 – Work on marketing plan in preparation of THEC Approval

- Work with Marketing and Public Affairs to craft press release
- Work with Marketing and Graphics to develop web page, video, and print materials
- Develop social media platforms and strategy
- Develop new Data Science brochures and banner for recruiting events
- Meet with Admissions Office (recruiters), CBAS, CBUS, CBHS, and CME College Advisors, and Undeclared Advisors to brief recruiters on new degree that is proposed for fall 2020.

11/2019 – THEC Board approves degree

- Press Release announcing new degrees is distributed
- Campus-wide email announcing degree approval
- Email to students in Information Systems & Analytics, Computer Science, Math, and other technology and data related degrees at MTSU.
- Revised MTSU Programs and new Data Science web pages are published
- Launch social media platforms
- Develop recruitment materials (brochures, banners, rack cards, billboard on I-24)
- “Data Science starting fall 2020” announcement on MTSU homepage
- Develop a marketing plan that continues each semester:
  - Promote Data Science major to community colleges through advisors and programs that lead well to the degree.
  - Contact CBAS, Media and Entertainment, CBHS, CBUS, Veterans Center, and Undeclared Advisors to confirm approval of new Data Science major.
  - Send press release and article to TN media outlets to announce degree
  - Announce to HS feeder programs

- Identify technology and data related classes in feeder high schools and speak in schools to promote the new degree.
  - Organize student interest meeting to answer questions about new major.
  - Promote the program through the Data Science Institute through its events and marketing outlets.
  - Send announcements to the Nashville Technology Council to announce the degree to the Nashville community.
  - Speak and promote at local meetups and organizations in Data Science.
- Formally create the Data Science external advisory board that incorporates Chief Data Scientists, CIOs, and CEOs in Nashville that are leading the Data Science industry.

1/2020 – Spring 2020 Semester begins

- Email/text sent to all “undeclared” majors informing them of new degree option
- Send recruitment materials to all public high schools in Tennessee, all TN community colleges, and statewide organizations in Data Science.
- Faculty personally visit with select TN high schools with STEM focused programs
- Data Science billboard active on I-24
- Data Science announcement on MTSU homepage
- Continue to maintain the marketing plan developed 11/2019 (see above for individual action items).

3/2020 – Pre-registration and Registration Prep

- Contact CBAS, Media and Entertainment, CBUS, Veterans Center, and Undeclared Advisors to confirm approval of new Data Science major.
- Continue to offer events, such as Data Science Institute Data dives which promote the new Data Science undergraduate program.

4/2020 – Priority Registration for fall semester begins

- Follow up email/text to “undeclared” majors

5/2020 – Customs (new student and transfer student orientation) begins

- Faculty & Data Science Program Director attend:
  - Freshman orientation
  - Transfer Orientation
  - Preview Days

8/2020 – Fall semester begins

- Welcome first cohort of Data Science majors
- Continued social media, web page, marketing campaigns
- True Blue Tour
- High school recruiting events – including possible Data Dives with HS students
- Continue to maintain the marketing plan developed 11/2019 (see above for individual action items).
- Initiate search for new full-time faculty member
- Identify out-of-state majors for potential Academic Common Market opportunities
- Priority registration begins for spring term
- Survey of current Data Science students to evaluate successful recruiting techniques

1/2021 – Spring semester begins

- Continue to maintain the marketing plan developed 11/2019 (see above for individual action items).
- Continue working with the Data Science Institute on events to promote the degree at MTSU
- Host finalists for new faculty position (student event with job candidates)
- Conclude search – make offer
- Professionalization and Career Workshop
- (3/21) Priority registration begins for fall term

## Future academic year activities years 3, 4 and 5 (ongoing)

### **Fall**

- Continued social media, web page, meeting with local high school feeder programs, marketing campaigns
- True Blue Tour
- High school recruiting events – including possible Data Dives with HS students
- Campus tours
- Special Events in conjunction with Data Science Institute (guest speakers / colloquia / etc.)
- Survey of current Data Science students to evaluate successful recruiting techniques
- Continue to maintain the marketing plan developed 11/2019 (see above for individual action items).

### **Spring**

- Email to advisors highlighting recent development and ongoing data science initiatives
- Continued social media, web page, meeting with local high school feeder programs, marketing campaigns
- True Blue Tour
- High school recruiting events – including possible Data Dives with HS students
- Campus tours
- Special Events in conjunction with Data Science Institute (guest speakers / colloquia / etc.)
- Survey of current Data Science students to evaluate successful recruiting techniques
- Continue to maintain the marketing plan developed 11/2019 (see above for individual action items).



January 16, 2019

Mike Krause, Executive Director  
Tennessee Higher Education Commission  
404 James Robertson Parkway, Suite 1900  
Nashville, TN 37243

Re: Data Science Undergraduate Degree at Middle Tennessee State University

Dear Director Krause:

Please accept this letter of support for the proposed data science undergraduate degree program at MTSU.

The Nashville Area Chamber of Commerce is the largest business federation in Middle Tennessee and has been continuously working on behalf of business since 1847. The Chamber is a nonprofit organization dedicated to creating economic prosperity by facilitating community leadership. The Nashville Area Chamber represents more than 2,200 member businesses in 15 counties. Through a wide variety of programs and initiatives, the Chamber works to positively impact the economic vitality and enhance the quality of life in the region, while supporting the growth and prosperity of Chamber-member businesses and our partners.

The Chamber is committed to efforts contributing to a stronger workforce in the Nashville region especially as it relates to building our technology industry. The tech sector spans all major industries in our region with thousands of job opportunities and serves as the enabling force driving innovation and growth in healthcare, music, manufacturing, finance and many others. Middle Tennessee's tech workforce growth is projected to outpace national tech workforce growth by 78% over the next five years, and the need for more technology-focused programs is critical.

The tech industry continues to evolve allowing companies to collect more data than ever, and the Chamber is supportive of the creation of MTSU's data science undergraduate degree to teach students the appropriate skills to analyze and report meaningful information to help solve business problems. We believe Middle Tennessee State University will provide a significant impact to the number of tech graduates in our region and see the establishment of this program helping to fill a need in a rapidly growing tech field of study with equally growing employment needs.

We are pleased to offer this letter of support and encourage the Tennessee Higher Education Commission to approve the establishment of a data science undergraduate degree program at Middle Tennessee State University.

Sincerely,

A handwritten signature in black ink that appears to read "Ralph Schulz".

Ralph Schulz  
President and CEO

211 Commerce Street, Suite 100

Nashville, Tennessee 37201

phone - 615.743.3000

fax - 615.743.3002

online - [nashvillechamber.com](http://nashvillechamber.com)



www.juiceanalytics.com | 209 10th Avenue South, Suite 450, Nashville TN 37201

January 13, 2019

Zach Gemignani  
CEO and co-founder, Juice Analytics  
209 10th Avenue South, Suite 450  
Nashville TN 37201  
(202) 251-7750

Charlie H. Apigian, PhD.  
Interim Director of the Data Science Institute  
Professor of Information Systems & Analytics  
Jones College of Business  
Middle Tennessee State University  
MTSU Box 45, Business and Aerospace N337  
(615) 898-2375

Dear Professor Apigian,

I am writing this letter to express my support for the MTSU Data Science undergraduate degree.

I am founder and CEO of Juice Analytics, a Nashville-based data visualization software company. We work with numerous clients locally and nationally who are using data to empower their businesses. As a result, we have developed a good understanding of the needs of enterprises in their use of data science and analytics. There are a couple critical elements that employers need that I believe are well supported by the proposed MTSU program:

- I appreciate the focus on communication of data. Among all the skills for analysts, the most neglected (and yet most critical) is their ability convey the results of their work to decision-makers.
- Similarly, the curriculum of the program emphasizes practical experience in connecting data science to business problems. By providing flexibility to pursue coursework outside of data science, you are encouraging building contextual knowledge that can be applied to data science problem solving.

Over last 5 years, I've been committed to building a stronger analytics community in the middle Tennessee region. In addition to my role as a business leader, I am deeply involved

# juiceanalytics

www.juiceanalytics.com | 209 10th Avenue South, Suite 450, Nashville TN 37201

with Nashville's primary event focused on data and analytics, the Nashville Analytics Summit. This annual event brings together the business, government, and educational communities to share best practices and connect the data community. I believe the MTSU program can contribute to making our region a hub for data and analytics solution providers and data-driven enterprises. The local talent-base is an essential limited factor for many companies trying to extend their capabilities in this area.

Thank you for your efforts and consideration.

Regards,



Zach Gemignani

January 12, 2019

To Whom It May Concern:

I am writing this letter in support of the request by Middle Tennessee State University (MTSU) to start a Data Science Undergraduate Degree Program. It is widely recognized that data science is a critical skillset and one that will drive the next wave of innovation. It is such an important capability that the AI movement is being called The Fifth Industrial Revolution.

I have been blessed to lead multiple data science companies. I can tell you first-hand how impactful this skillset is for businesses and I can also attest to how difficult it is to find qualified candidates with practical hands on experience.

I have also had the privilege of working with the technology leaders at MTSU and am confident in their ability to provide this much needed expertise to middle Tennessee. I've been in the classroom with the MTSU professors and their students and witnessed how they teach more than just theory. Their approach is one of practical application and as a result, graduates are equipped to enter the marketplace with real world experience. This doesn't occur by happenstance but rather through a significant investment in building relationships with business leaders to ensure an understanding the marketplace and its needs. The feedback received from the business community becomes an important input into building the curriculum taught in the classroom. In fact, the proposal before you is reflective of the approach I just described. Business leaders, myself included, have been consulted along the way as Data Science Undergraduate Degree Program has been put together.

As an employer, I'm grateful that MTSU is investing in leading the charge of equipping students - who will become colleagues and leaders in our community - with the skills needed to lead The Fifth Industrial Revolution.

To the extent that it is helpful, I am more than willing to speak with anyone about why this program is important or why I believe MTSU is uniquely equipped to deliver it.

Thank you in advance for your consideration of this letter of support.

Sincerely,



Ray Guzman | CEO  
SwitchPoint Ventures  
[Ray.Guzman@SwitchPointVentures.com](mailto:Ray.Guzman@SwitchPointVentures.com)  
615-423-1766



January 14, 2019

Charlie H. Apigian, Ph.D.  
Interim Director of the Data Science Institute  
Professor of Information Systems & Analytics  
Middle Tennessee State University  
Murfreesboro, TN 37132

Dr. Apigian:

I am writing this letter in strong support of the data science undergraduate degree program at MTSU. Creating modern skillsets within our workforce is the key to the future of our region, state, and country, and it is vital that we build programs to prepare students with data science skills at an undergraduate level.

One of the driving economic forces today is the transformation of business models through big data analytics, machine learning, and high-performance computing. This trend will accelerate in the next few years, yet we face a significant constraint in the absence of a pipeline of skilled workers. As one of the leading technology companies in the mid-Tennessee region, we struggle to hire people with proper training and preparation. In our experience, students in graduate-level data science programs have fundamental gaps in knowledge and skills that must be addressed through significant remedial training. An undergraduate data science degree program at MTSU would fill this important gap in our current education framework and accelerate productivity and time-to-value in our business.

With a strong data science workforce, we build a vibrant community that can both attract businesses and stimulate innovation within our region. The undergraduate data science program at MTSU will open doors to successful technology careers for our talented youth that can improve our business environment and society. It will create a pipeline that fuels growth in our region for the next decade. And it can establish an effective model for other schools in our state in training the workforce of the next century.

I look forward to the success of the undergraduate data science program at MTSU.

Sincerely,

A handwritten signature in black ink, appearing to read "John Liu".

John Liu, Ph.D. CFA  
VP of Data Science, Applied Machine Learning



January 16, 2019

Mike Krause, Executive Director  
Tennessee Higher Education Commission  
404 James Robertson Parkway, Suite 1900  
Nashville, TN 37243

Re: Data Science Undergraduate Degree at Middle Tennessee State University

Dear Director Krause:

Please accept this letter of support for the proposed data science undergraduate degree program at MTSU.

The Nashville Area Chamber of Commerce is the largest business federation in Middle Tennessee and has been continuously working on behalf of business since 1847. The Chamber is a nonprofit organization dedicated to creating economic prosperity by facilitating community leadership. The Nashville Area Chamber represents more than 2,200 member businesses in 15 counties. Through a wide variety of programs and initiatives, the Chamber works to positively impact the economic vitality and enhance the quality of life in the region, while supporting the growth and prosperity of Chamber-member businesses and our partners.

The Chamber is committed to efforts contributing to a stronger workforce in the Nashville region especially as it relates to building our technology industry. The tech sector spans all major industries in our region with thousands of job opportunities and serves as the enabling force driving innovation and growth in healthcare, music, manufacturing, finance and many others. Middle Tennessee's tech workforce growth is projected to outpace national tech workforce growth by 78% over the next five years, and the need for more technology-focused programs is critical.

The tech industry continues to evolve allowing companies to collect more data than ever, and the Chamber is supportive of the creation of MTSU's data science undergraduate degree to teach students the appropriate skills to analyze and report meaningful information to help solve business problems. We believe Middle Tennessee State University will provide a significant impact to the number of tech graduates in our region and see the establishment of this program helping to fill a need in a rapidly growing tech field of study with equally growing employment needs.

We are pleased to offer this letter of support and encourage the Tennessee Higher Education Commission to approve the establishment of a data science undergraduate degree program at Middle Tennessee State University.

Sincerely,

A handwritten signature in black ink that appears to read "Ralph Schulz".

Ralph Schulz  
President and CEO

211 Commerce Street, Suite 100

Nashville, Tennessee 37201

phone - 615.743.3000

fax - 615.743.3002

online - [nashvillechamber.com](http://nashvillechamber.com)

January 18, 2019

Charlie H. Apigian, PhD.  
Interim Director of the Data Science Institute  
Professor of Information Systems & Analytics  
Middle Tennessee State University

Dr. Apigian;

Technology continues to evolve and allow companies to collect more data. However, with the vast amounts of data that have been collected, we still lack the appropriate skills to clean, store, analyze, and report meaningful information that can help solve business problems. Therefore, there is a growing need for individuals that have skills that will help analyze and report information that will be beneficial.

To achieve this, an individual will have to have good fundamental statistics and math skills, an ability to code, and a good understanding of business and the other intangible skills that allow one to problem solve. This is not easy to learn, and will probably be a lifelong learner, but the opportunity for an individual to get started as an undergraduate is very exciting.

I fully support Dr. Apigian's efforts to develop a data science undergraduate program at Middle Tennessee State University (MTSU) to address each of these learning objectives. MTSU has been a great business and technology partner in the mid-state region to many organizations. An undergraduate degree in data science would not only offer a good education, but will allow for K-12 schools to point kids toward a future program and get them excited about staying in a tech-related career.

This program will provide the necessary skilled applicants to a booming Nashville and Middle Tennessee job market right now. Equally, it will prevent companies from looking elsewhere, strengthening the vitality of the region for years to come.

Regards



Ken Raetz, CEO

Think Data Insights, LLC



January 10, 2019

Charlie H. Apigian, PhD.  
Interim Director of the Data Science Institute  
Professor of Information Systems & Analytics  
Jones College of Business  
Middle Tennessee State University  
MTSU Box 45  
Murfreesboro, TN 37132

Dear Dr. Apigian,

I'm writing in strong support of the development of a Data Science undergraduate degree at Middle Tennessee State University.

Rutherford Works, the Economic and Workforce Development division of the Rutherford County Chamber of Commerce, has been working with our local employers for the past four years to help identify technical skills gaps and, with our educational partners help, to develop educational solutions which train students for the high wage, high demand jobs currently available in our community. We term this work Pathways Development. Information Technology is one of our high 5 (wage, growth, employment) industry sectors. Based on the number of job openings and the projected job openings specifically for business and data analysts in the next 5-10 years, there is great opportunity and need for new programming.

Additionally, this program would dovetail with our work at the high school level. We define Pathways Development as the creation of seamless opportunities for students to move from high school to post-secondary while earning early post-secondary credit, industry certifications and relevant work experience. The Chamber of Commerce, Rutherford Works and our industry led Rutherford Works Technology Council have been working with Rutherford County Schools to increase the number of high schools offering IT related programs of study. We have also been working with the Tennessee Department of Education to add new programs of study for the state. Based on the growing number of tech jobs in Middle Tennessee and Northern Alabama, the future looks bright for Rutherford County students who gain an advantage by studying IT related programs and earning relevant industry certifications in high school. A new data analytics program of study at the high school level is a real possibility as well.

In my capacity leading the Rutherford Works Workforce Development strategic imperatives, I look forward to working with MTSU to continue to develop new programs of study that provide opportunity for our students and provide a well-trained workforce for our employers.

Sincerely,

A handwritten signature in black ink, appearing to read "K. Beth Dufield".

K. Beth Dufield  
Senior Vice President, Education and Workforce Development  
Rutherford County Chamber of Commerce

January 14, 2019



Charlie Apigian  
Interim Director of the Data Science Institute  
Professor of Information Systems and Analytics  
Middle Tennessee State University  
1301 E Main St, MTSU Box 45  
Murfreesboro, TN 37132

Subject: MTSU Data Science Undergraduate Program

To Whom It May Concern:

As a spokesman for Williamson County and the broader Middle Tennessee economy, I have repeatedly seen the benefits that a well-educated workforce brings to the region. Working in Tennessee's most educated county - with the greatest percentage of adults holding an advanced degree, we have consistently reaped the rewards of strong growth for existing businesses and continued movement of high-paying jobs into the region.

Middle Tennessee State University has been an essential partner for Williamson County to be able to maintain this record job growth. Students from the Jones College of Business are some of the most sought-after graduates in the region and continuing to diversify their programming and meet industry specific needs is necessary to keep up with a fluctuating market.

Data Science represents one of these growing industry needs, as 25% job growth is expected in the next 10 years across Tennessee, with even higher numbers expected in Williamson County due to its large number of headquarter companies. Meeting this demand locally will continue to offer our companies a strategic advantage as competition for these graduates increases across the country.

I strongly support the implementation of an undergraduate Data Science program, and think it fills a very important role in our current workforce initiatives. Please join in support of this great initiative.

Sincerely,

A handwritten signature in black ink, appearing to read "Matt Largent".

Matt Largent  
President & CEO

**CHARLES H. APIGIAN, Ph.D.**  
**Information Systems and Analytics • Middle Tennessee State University**  
**Phone: 615-898-2375 • charles.apigian@mtsu.edu • capigian.com**

**EDUCATION:**

UNIVERSITY OF TOLEDO, Ph.D., Manufacturing Management	May 2003
WAYNE STATE UNIVERSITY, Master of Business Administration	December 1998
BOWLING GREEN STATE UNIVERSITY, B.S. in Business Administration	May 1995

**ACADEMIC EXPERIENCE:**

MIDDLE TENNESSEE STATE UNIVERISTY; Murfreesboro, TN <b>Interim Director - Data Science Institute</b>	May 2018 - Present
<b>Chair - Information Systems and Analytics</b>	August 2013 – May 2018
<b>Professor - Information Systems and Analytics</b>	August 2002 - Present
MIDDLE TENNESSEE STATE UNIVERISTY; Murfreesboro, TN <b>Academic Coordinator for the McNair Scholars Program</b>	August 2009 - 2011
UNIVERSITY OF TOLEDO; Toledo, OH <b>Graduate Assistant</b>	August 2000 – May 2002

**WORK EXPERIENCE:**

KACE SERVICES, L.L.C. - Canton, MI <b>Senior Consultant and Lead Assessor to Quality Systems</b> (ex. ISO9001, ISO17025, etc.)	January 2000 - 2002
CONCORD PRECISION, INC.; Westland, MI <b>Vice President</b>	May 1995 – December 2001
CONCORD PRECISION, INC.; Westland, MI <b>Toolmaker Apprentice</b>	January 1990 – April 1995

**SELECTED PUBLICATIONS:**

- Apigian, C. H. & Shotwell, M. (2015). “*Student Performance and Success Factors in Learning Business Statistics in Online vs. On-ground Classes using a Web-Based Assessment Platform.*” *Journal of Statistical Education*, 23 (1), 19.
- Apigian, C. H. & Gambill, S. (2014). “*A Descriptive Study of Graduate Information Systems Curriculums. Review of Business Information Systems*”, 18 (2), 47-52.
- Gilliam, J. & Apigian, C. H. (2012) “*An Analysis of the Factors that Contribute to Intellectual Property Theft,*” Franklin Business & Law Review Journal, Vol. 2012 No. 2, pp. 21- 44
- Metts, Glenn A. and Charles Apigian (2011) “*Reducing Manufacturing Flow Times: Job Shop Simulation and Reconfiguration,*” World Review of Business Research, Vol. 1, No. 4, pp. 97-108
- Apigian, Charles H. and Stanley E. Gambill (2010) “*Are We Teaching the IS 2009 Model Curriculum?*”, *Journal of Information Systems Education*, Vol. 21, No. 4, pp. 411-420.
- Gerald, Jason and Charles H. Apigian (2010). “*How Much is Too Much?: An Analysis of CEO Compensation Among High-Profile Financial Services Firms Receiving TARP Investments.*” *McNair Research Review*, Vol. 8, pp. 31 – 43.
- Joyner, Ryne and Charles H. Apigian (2009). “*Radio-Frequency Identification: A Risk and Benefit Analysis.*” *McNair Research Review*, Vol. 7, pp. 144-156.
- Blackman, J. & Charles H. Apigian (2007). “*Personal Privacy: Analysis of Internet Risks.*” *McNair Research Review*, Vol. 5, pp. 22-25.
- Apigian, Charles H., T.S. Ragu-Nathan, and Bhanu Ragu-Nathan, (2006) “*Strategic Profiles and Internet Performance: An Empirical Investigation into the Development of Strategically Developed Internet Systems,*” *Information & Management*, Vol. 43, No. 4, pp. 455 – 468.

- Apigian, Charles H., T.S. Ragu-Nathan, Bhanu Ragu-Nathan, and Anand Kunnathur, (2005) "Internet Technology: The Strategic Imperative," Journal of Electronic Commerce Research, Vol. 6, No. 2, pp. 123-145.
- Apigian, Charles H., Bhanu Ragu-Nathan, T.S. Ragu-Nathan, and Qiang Tu (2005) "Organizational Determinants of IS Performance: A Strategic Profile Perspective," Journal of Business Technology, Vol. 4, No. 2.
- Seipel, Scott and Charles H. Apigian, (2005) "Perfectionism in Students: Implications in the Instruction of Statistics", Journal of Statistics Information, Vol. 13, No. 2.
- Apigian, Charles H. and Stanley E. Gambill, (2004) "Is Microsoft Excel 2003 Ready for the Statistics Classroom?" Journal of Computer Information Systems, Vol. 45, No. 2, pp. 27-35.
- Ragu-Nathan, Bhanu, Charles H. Apigian, T.S. Ragu-Nathan, and Qiang Tu, (2004). "A Path Analytical Study of the Effect of Top Management Support for Information Systems," Omega: The International Journal of Management Science, Vol. 32, No. 6, pp. 459-471.
- Syamil, Ahmad, William Doll, and Charles H. Apigian, (2004) "Product Development Process Performance Measures and Impacts," European Journal of Innovation Management, Vol. 7, No. 3 pp. 205-217

#### **SELECTED HONORS AND AWARDS:**

- Nashville Technology Council (2017) – Community Leader of the Year – Winner
- Nashville Technology Council (2016) – Community Leader of the Year – Finalist
- Nashville Technology Council (2015) – Educator of the Year – Finalist
- Nashville Technology Council (2014) – Educator of the Year – Finalist
- Outstanding Public Service Award (2013) – presented to two faculty at MTSU for service to the community
- Proclamation from the Mayor (2012) – for service providing events for kids to get active in Murfreesboro, TN
- Tennessee Recreation and Parks Association Volunteer Service Award (2011)
- MBAA Distinguished Paper Award (2011)
- Outstanding Faculty Member in the College of Business (2005 – 2006)
- Gamma Iota Sigma Outstanding Professor in the College of Business (2005)
- Gamma Iota Sigma Outstanding Professor in the College of Business – (2004)
- Bridgestone/Firestone Distinguished Assistant Professorship in the College of Business (2004)

#### **GRANTS AND FUNDING AWARDED:**

- Microstrategy Software and Service \$1,500,000 (Awarded Fall 2014)  
Donated all software and infrastructure to build a system for teaching analytics and reporting.
- Kathy and Steve Anderson Endowed Chair \$1,500,000 (endowed Fall 2015)  
This is a gift as part of an estate plan to endow a chair in information systems with the direct benefit going to students, industry partners, and research.
- Public Service Grant \$5,123 (Awarded 2011 and 2012)  
Grant to print and publish the 2<sup>nd</sup> 5X8 handout for kid activity and to initiate the Try Boro Century Club of Activity. This will be distributed to 18,000 students in the Murfreesboro City Schools.
- Center for Physical Activity and Health in Youth \$12,538.00 (Awarded 2009, 2010, 2011, and 2012)  
Received grant to continue to pursue activities to encourage physical fitness in youth. Helped to host 5 triathlon kid clinics, 3 endurance events, and the culmination of a research project on the motivations of physical activity in youth. Also developed the 100% Challenge which promotes physical activity for kids in the Murfreesboro area.
- Faculty Development Grant - \$1,500 (Awarded April 2007)  
Received the award to help fund training for Information Security and IT Auditing.
- Bridgestone/Firestone Distinguished Assistant Professorship - \$5,000 (Awarded Fall 2004)  
Received as the top Assistant Professor in the College of Business. Used for research and travel.
- Toledo Family Business Center - \$2,500 (Awarded August 2001)  
Awarded for research that pertains to my dissertation. The 205 members have also given permission to allow me to interview and survey their companies to develop and test the model.

#### **ACADEMIC MEMBERSHIPS AND ASSOCIATIONS:**

- Board Member – Nashville Technology Council – Since 2016
- Information Systems Audit and Control Association – ISACA – Since 8/2006
- DSI Member – Since 5/2001
- Institute of Supply Chain Managers - Since 2/2004
- Association of Information Technology Professionals – Since 5/2004

# Stoney Brooks

## Curriculum Vitae

---

Assistant Professor of Information Systems & Analytics  
Jones College of Business  
Middle Tennessee State University  
Business and Aerospace N349  
Murfreesboro, TN 37132

email: Stoney.Brooks@mtsu.edu  
phone (W): (615) 898-5765  
phone (C): (303) 748-6530

### **ACADEMIC EXPERIENCE**

---

2014-Present

**Assistant Professor**, Department of Information Systems & Analytics, Middle Tennessee State University

### **EDUCATION**

---

Ph.D. Management Information Systems - Washington State University, Pullman, WA. 2013

### **PEER REVIEWED ARTICLES**

---

Longstreet, P., **Brooks, S.**, and Gonzalez, E. (forthcoming). "Internet Addiction: When Feel Good Usage Becomes a Bad Consequence". *Technology in Society*

Datta, A., Sahaym, A., and **Brooks, S.** (2018). "Unpacking the Antecedents of Crowdfunding Campaign's Success: The Effects of Social Media and Innovation Orientation". *Journal of Small Business Management*

**Brooks, S.**, Wang, X., and Schneider, C. (2020). "Technology Addictions and Technostress: An Examination of the U.S. and China". Accepted at *Journal of Organizational and End User Computing*.

**Brooks, S.**, Clark, J., Clark, C., and Gambill, S. (2018). "The Information Systems name game revisited: Still muddled 20 years later." *Journal of Computer Information Systems*, pp 1-6

**Brooks, S.**, Hedman, J., Henningsson, S., Sarker, S., Wang, X. (2018) "Antecedents and Effects of Green IS Initiatives: Insights from Nordea". *Journal of Cases on Information Technology*

Lin, X., Featherman, M., **Brooks, S.**, and Hajli, M. (2018). "Exploring gender differences in online consumer purchase decision making: an online product presentation perspective". *Information Systems Frontiers*, pp 1-15

Clark, J., Clark, C., Gambill, S., and **Brooks, S.** (2017). "IS Curriculum Models, course offerings, and other academic myths/hopes" *Journal of Higher Education Theory and Practice*, 17(9), pp 61-68

Longstreet, P., and **Brooks, S.** (2017). "Life Satisfaction: A Key to Managing Internet & Social Media Addiction" *Technology in Society*, 50, pp. 73-77

**Brooks, S.** (2017). "Interdisciplinary App Development Project: A Case Study Across Three Departments". *Journal of Cases on Information Technology*, 19(3), pp. 15-23

Nelson, D., **Brooks, S.**, Sahaym, A., and Cullen, J. (2017). "Family-friendly Work Perceptions: A Cross Country Analysis" *Gender in Management: An International Journal*, 32(4), pp. 300-316

**Brooks, S.**, Longstreet, P., and Califf, C. (2017). "Social Media Induced Technostress and its Impact on

Internet Addiction: A Distraction-conflict Theory Perspective" *AIS Transactions on Human-Computer Interaction*, 9(2), pp 99-122

**Brooks, S.** and Califf, C. (2017). "Social Media-Induced Technostress: Its Impact on Job Performance and the Moderating Role of Job Characteristics" *Computer Networks*, 114, pp 143-153

**Brooks, S.**, Gambill, S., Clark, J., and Clark, C. (2016). "What's in a Name? An Examination of Information System Degree Programs in AACSB International Accredited Schools." *Journal of Higher Education Theory and Practice*, 16(6)

**Brooks, S.**, and Taylor, J. (2016). "Improving the teaching of Microsoft Excel: Traditional book versus online platform" *Journal of Education for Business*, 91(5), pp 251-257

**Brooks, S.**, and Longstreet, P (2015). "Social Networking's Peril: Cognitive Absorption, Social Networking Usage, and Depression" *CyberPsychology: Journal of Psychosocial Research on Cyberspace*, 9(4)

Wang, X., **Brooks, S.**, and Sarker, S. (2015). "Understanding Green IS Initiatives: A Multi-theoretical Framework" *Communications of the Association for Information Systems*, 37, Article 32

Wang, X., **Brooks, S.**, and Sarker, S. (2015). "A Review of the Green IS Research and Directions for Future Studies" *Communications of the Association for Information Systems*, 37(1), pp 395-429

**Brooks, S.** (2015). "Does personal social media usage affect efficiency and well-being?" *Computers in Human Behavior*, 46, pp 26-37

## CONFERENCE PROCEEDINGS

---

Datta, A., and **Brooks, S.** (2018). "Crowdfunding-campaign success: The effect of entrepreneurial orientation and social media," *Academy of Management Proceedings*, Chicago, IL, USA

Islam, N., Whelan, E., and **Brooks, S.** (2018). "Social Media Overload And Fatigue: The Moderating Role Of Multitasking Computer Self-Efficacy," *Americas Conference on Information Systems 2018 Proceedings*, New Orleans, LA, USA

Datta, A., Sahaym, A., and **Brooks, S.** (2018). "Determinants of Crowdfunding Campaign Success: The Effect of Entrepreneurial Orientation and Strategic Use of Social Media," *Proceedings of Western Academy of Management 2018*, Salt Lake City, UT, USA

Whelan, E., Islam, N., and **Brooks, S.** (2017). "Cognitive Control and Social Media Overload" *Americas Conference on Information Systems 2017 Proceedings*, Boston, MA, USA

Sahaym, A., Datta, A., and **Brooks, S.** (2017). "Role of Entrepreneurial Orientation and Social Media on New Product Creation: A Socialnomics view" *2017 Academy of Management Annual Meeting*, Atlanta, GA, USA

**Brooks, S.**, Schneider, C., and Wang, X. (2016). "Technology Addictions and Technostress: An Examination of Hong Kong and the U.S." *Americas Conference on Information Systems 2016 Proceedings*, San Diego, CA, USA

**Brooks, S.** (2016) "Personal Social Media in the Workplace: The Influence of Job Characteristics and Technostress on Performance" *MBAA International Annual Conference 2016 Proceedings*, Chicago, IL, USA

**Brooks, S.** and Longstreet, P. (2015). "Life Satisfaction: The Key to Managing Internet & Social Media Addiction," *Americas Conference on Information Systems 2015 Proceedings*, Fajardo, PR, USA

**Brooks, S.** (2015). "Being Social isn't Just About Fun: An Examination of Personal Social Media Usage," *Americas Conference on Information Systems 2015 Proceedings*, Fajardo, PR, USA

**Brooks, S.** (2015). "Do Demographics Matter? The Role of Gender, Age, Socioeconomic Status, and Ethnic Identity on Website Personalization," *MBAA International Annual Conference 2015 Proceedings*, Chicago, IL, USA

## **TEACHING**

---

### **Middle Tennessee State University**

#### **Murfreesboro Campus**

**INFS 3100 – Principles of Management Information Systems**  
**INFS 3800 – Project Management and Systems Development**  
**INFS 4790/5790 – Database Design and Development**  
**INFS 6610 – Managing Information Technology**  
**INFS 6790 – Seminar in Database Management**  
**QM 3620 – Statistical Methods II**

#### **Online Campus**

**INFS 2200 – Introduction to Microcomputing**  
**BIA 2610 – Statistical Methods**  
**BIA 3621 – Introduction to Business Analytics Lab**  
**MNBA/INFS 6835 – IT Applications for Decision Making**

## **HONORS AND AWARDS**

---

Bridgestone Americas Distinguished Lecturer, Jones College of Business, 2018  
E.W. "Wink" Midgett Faculty Research Award, 2018  
MBAA International McGraw-Hill Distinguished Paper Award – SAIS, 2016

## **CERTIFICATIONS**

---

Microsoft Certified Technical Specialist – SQL Server 2005

## **COMPUTER SKILLS**

---

Programming Languages: T-SQL, PL/SQL, VB.NET, C#.NET, ASP.NET, Java, HTML  
Database Software: Oracle, SQL Server, Access  
BI/Analytics Software: Tableau, Excel  
Statistical Software: SPSS, MPlus, SmartPLS  
Office Software: Word, Excel, Access, PowerPoint, Visio, Project

---

# FERROL ADERHOLDT

---

1301 East Main Street

Department of Computer Science, MTSU Box 48

Middle Tennessee State University, Murfreesboro, TN 37132

(615) 898-2801

[ferrol.aderholdt@mtsu.edu](mailto:ferrol.aderholdt@mtsu.edu)

## Education

- **Tennessee Technological University**—Cookeville, TN  
*Ph.D. in Engineering, May 2016*
  - Dissertation: Towards a Framework for Survivable Clouds
  - Advisor: Stephen L. Scott
- **Tennessee Technological University**—Cookeville, TN  
*Masters of Science in Computer Science, August 2011*
  - Thesis: Integrity-based Intrusion Detection Systems Using Virtualization
  - Advisors: Stephen L. Scott and Sheikh Ghafoor
- **Tennessee Technological University**—Cookeville, TN  
*Bachelor of Science in Computer Science with minor in Mathematics, December 2008*

## Professional Experience

- **Middle Tennessee State University: Computer Science Department**—Murfreesboro, TN  
*Assistant Professor: August 2018 - Present*
  - Developed and delivered course instruction for graduate and undergraduate courses
  - Conduct independent and collaborative research
- **Oak Ridge National Laboratory**—Oak Ridge, TN  
*Postdoctoral Research Associate: January 2016 - July 2018*
  - Designed and developed the SHARed data-structure centric Parallel programming abstraction (SharP), which abstracts heterogeneous and hierarchical memories and enables data-centric applications on modern and future extreme-scale systems while remaining interoperable with popular programming models such as MPI and OpenSHMEM
  - Extended the OpenSHMEM-X reference implementation at Oak Ridge National Laboratory to support the use of Unified Communication X (UCX) communication layer
  - Explored the adaptation of graph-based algorithms for PGAS models with OpenSHMEM
- **Tennessee Technological University: Electrical and Computer Engineering Department**—Cookeville, TN  
*Teaching Assistant: August 2015 - December 2015*
  - Assisted students with the understanding of introductory concepts (i.e., data structures) and techniques during hands-on labs
- **Tennessee Technological University: Computer Science Department**—Cookeville, TN  
*Lecturer: August 2014 - December 2014*
  - Lectured graduate students on network protocols and web services
- **Tennessee Technological University**—Cookeville, TN  
*Research Assistant: January 2010 - August 2010, August 2011 - June 2015*

- Researched isolation and security mechanisms present in Cloud environments in conjunction with Oak Ridge National Laboratory to develop a secure, isolation-centric HPC cloud architecture
  - Conducted research related to virtualization for HPC systems with the Palacios hypervisor and resilience with the University of New Mexico, Northwestern University, Sandia National Laboratory, and Oak Ridge National Laboratory
  - Researched methods to improve I/O performance for virtual machines in HPC and Cloud environments
  - Investigated methods to detect and prevent the loading of kernel-level rootkits in virtual environments using virtual machine introspection
- **Tennessee Technological University: Computer Science Department**—Cookeville, TN  
*Teaching Assistant: January 2009 - December 2009, August 2010 - May 2011*
    - Assisted professors in teaching introductory Computer Science classes including providing several lectures with topics ranging from data structures to parallel and distributed computing
  - **Oak Ridge National Laboratory**—Oak Ridge, TN  
*Intern: June 2007 – May 2009*
    - Extended SystemImager used by the open-source cluster management software OSCAR to create support for various booting methods using nodes with and without hard disks
    - Extended the Xen hypervisor to support loadable hypervisor modules (LHMs) to provide a basic mechanism for a dynamic VMM during runtime
    - Developed the Hypervisor Instrumentation Toolkit (HIT) for tracing and profiling of the Xen hypervisor during runtime

## Publications

### Peer-Reviewed Publications

1. Ferrol Aderholdt, Manjunath Gorentla Venkata, and Zachary W. Parchman. SharP Unified Memory Allocator: An Intent-based Memory Allocator for Extreme-scale Systems. In *Lecture Notes in Computer Science: Proceedings of the 24th European Conference on Parallel and Distributed Computing (Euro-Par) 2018*, Torino, Italy, August 27 - 31, 2018.
2. Ferrol Aderholdt, Swaroop Pophale, Manjunath Gorentla Venkata, and Neena Imam. OpenSHMEM Sets and Groups: An Approach to Worksharing and Memory Management. In *OpenSHMEM 2018: The Fifth Workshop on OpenSHMEM and Related Technologies (OpenSHMEM 2018)*. Hanover, MD. August 21 - 23, 2018.
3. Thomas Naughton, Ferrol Aderholdt, Matt Baker, Swaroop Pophale, and Manjunath Gorentla Venkata. Oak Ridge OpenSHMEM Benchmark Suite. In *OpenSHMEM 2018: The Fifth Workshop on OpenSHMEM and Related Technologies (OpenSHMEM 2018)*. Hanover, MD. August 21 - 23, 2018.
4. Ferrol Aderholdt, Manjunath Gorentla Venkata, and Zachary W. Parchman. SharP Data Constructs: Data Constructs to Enable Data-centric Computing. In *Proceedings of the 26th Euromicro International Conference on Parallel, Distributed, and Network-based Processing (PDP) 2018*, Cambridge, UK, March 21 - 23, 2018.
5. Ferrol Aderholdt, Susan Hicks, Thomas Naughton, Lawrence Sorrillo, Blake Caldwell, James Pogge, and Stephen L. Scott. Secure Enclaves: An Isolation-centric Approach for Creating Secure High-Performance Computing Environments. In *Proceedings of the 30th IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis (SC) 2017*, Denver, CO, USA, November 12 - 17, 2017.
6. Zachary W. Parchman, Ferrol Aderholdt, and Manjunath Gorentla Venkata. SharP Hash: A High-Performing Distributed Hash for Extreme-Scale Systems. In *IEEE International Conference on Cluster Computing (CLUSTER)*, Honolulu, Hawaii, Sept 5 - 8, 2017.

7. Manjunath Gorentla Venkata, Ferrol Aderholdt, and Zachary W. Parchman. SharP: Towards Programming Extreme-Scale Systems with Hierarchical Heterogeneous Memory. In *Proceedings of the 6th International Workshop on Heterogeneous and Unconventional Cluster Architectures and Applications*, Bristol, England, August 14, 2017.
8. Ferrol Aderholdt, Jeffrey A. Graves, Manjunath Gorentla Venkata. Parallelizing Single Source Shortest Path with OpenSHMEM. In *OpenSHMEM 2017: The Fourth Workshop on OpenSHMEM and Related Technologies (OpenSHMEM 2017)*. Annapolis, Maryland, August 7 - 9, 2017.
9. Thomas Naughton, Christian Engelmann, Geoffroy Vallée, Ferrol Aderholdt, and Stephen L. Scott. A Cooperative Approach to Virtual Machine Based Fault Injection. In *Lecture Notes in Computer Science: Proceedings of the 22nd European Conference on Parallel and Distributed Computing (Euro-Par) 2016 Workshops: 9th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids*, Grenoble, France, August 23, 2016.
10. Matt Baker, Ferrol Aderholdt, Manjunath Gorentla Venkata, and Pavel Shamis. OPENSHMEM-UCX: Evaluation of UCX for implementing the OpenSHMEM Programming Model. In *OpenSHMEM 2016: The Third Workshop on OpenSHMEM and Related Technologies (OpenSHMEM 2016)*. August 2 - 4, 2016.
11. Thomas Naughton, Garry Smith, Christian Engelmann, Geoffroy Vallée, Ferrol Aderholdt, and Stephen L. Scott. What is the right balance for performance and isolation with virtualization in HPC? In *Lecture Notes in Computer Science: Proceedings of the 20th European Conference on Parallel and Distributed Computing (Euro-Par) 2014 Workshops: 7th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids*, pages 570-581, Porto, Portugal, August 25, 2014.
12. Ferrol Aderholdt, Fang Han, Stephen L. Scott, and Thomas Naughton. Efficient Checkpointing of Virtual Machines using Virtual Machine Introspection. In *Proceedings of the 2014 14th IEEE/ACM International Symposium on Cluster, Cloud, and Grid Computing (CCGrid 2014)*. Chicago, IL, May 26 - 29, 2014.
13. Ferrol Aderholdt and Stephen L. Scott. The Secure Migration of a Virtual Machine Introspection Intrusion Detection System. In *Proceedings of the 11th IASTED International Conference on Parallel and Distributed Computing and Networks (PDCN) 2013*. Innsbruck, Austria, February 11 - 13, 2013.
14. Ben Eckart, Xubin He, Chentao Wu, Ferrol Aderholdt, Fang Han, and Stephen L. Scott. Distributed Virtual Diskless Checkpointing: A Highly Fault Tolerant Scheme for Virtualized Clusters. *Parallel and Distributed Processing Symposium Workshops and PhD Forum (IPDPSW), 2012 IEEE 26th International*. Shanghai, China, May 21 - 25, 2012.
15. Ferrol Aderholdt, Sheikh Ghafoor, Ambareen Siraj, and Stephen L. Scott. Integrity Based Intrusion Detection System for Enterprise and Cloud Environments. *Proceedings of the 4th IEEE/ACM International Conference on Utility and Cloud Computing (UCC 2011)*, December 2011.
16. Summer Olmstead, Joseph Stites, and Ferrol Aderholdt. A Layered Cyber Defense Strategy for Smart Grid Programmable Logic Controllers. In *Proceedings of the Seventh Annual Workshop on Cyber Security and Information Intelligence Research (CSIIRW '11)*, Oak Ridge, TN, October 12 - 14, 2011.
17. Benjamin Eckart, Ferrol Aderholdt, Juho Yoo, Xubin He, Stephen L. Scott. A Top-Down Approach to Dynamically Tune I/O for HPC Virtualization. *Proceedings of the 4th Workshop on System-level Virtualization for High Performance Computing (HPCVirt), in conjunction with the 5th ACM SIGOPS European Conference on Computer Systems (EuroSys)*, Paris, France, April 13 - 16, 2010.
18. Thomas Naughton, Geoffroy Vallée, Stephen L. Scott and Ferrol Aderholdt. Loadable Hypervisor Modules. In *43rd Annual Hawaii International Conference on System Sciences (HICSS-43)*, Koloa, Kauai, Hawaii, January 5 - 8, 2010.
19. Geoffroy Vallée, Thomas Naughton, Hong Ong, Anand Tikotekar, Christian Engelmann, Wesley Bland, Ferrol Aderholdt, and Stephen L. Scott. Virtual System Environments. In *2nd International DMTF Academic Alliance Workshop on Systems and Virtualization Management: Standards and New Technologies (SVM '08)*, Munich, Germany, October 21 - 22, 2008.

## Poster Presentations

1. Manjunath Gorentla Venkata and Ferrol Aderholdt. Towards Programming Hierarchical-Heterogeneous Memory-based Extreme-Scale Systems. At *Department of Energy Centers of Excellence Performance Portability Workshop 2017*. Denver, CO, USA, August 22 - 24, 2017.
2. Manjunath Gorentla Venkata, Ferrol Aderholdt, and Zachary W. Parchman. (Invited poster) Towards an Extreme-Scale Data-centric Programming Model. At *Smoky Mountains Computational Science and Engineering Conference*, Gatlinburg, TN, August 30 - September 1, 2016.
3. Ferrol Aderholdt, Benjamin Eckart, Xubin He, and Stephen L. Scott. Investigating Locality Reformations for Cluster Virtualization. *The 8th USENIX Conference on File and Storage Technologies (FAST 2010)*, San Jose, CA, February 23 - 26, 2010.

### **Technical Reports**

1. Ferrol Aderholdt, Blake Caldwell, Susan Hicks, Scott Koch, Thomas Naughton, Daniel Pelfrey, James Pogge, Stephen L. Scott, Galen Shipman, and Lawerence Sorrillo. Secure Enclaves: An Isolation-centric Approach for Creating Secure High Performance Computing Environments. Tech. Report. Oak Ridge National Laboratory. ORNL/TM-2016/710.
2. Ferrol Aderholdt, Blake Caldwell, Susan Hicks, Scott Koch, Thomas Naughton, Daniel Pelfrey, James Pogge, Stephen L. Scott, Galen Shipman, and Lawerence Sorrillo. Secure Storage Architectures. Tech. Report. Oak Ridge National Laboratory. ORNL/TM-2015/212.
3. Ferrol Aderholdt, Blake Caldwell, Susan Hicks, Scott Koch, Thomas Naughton, Daniel Pelfrey, James Pogge, Stephen L. Scott, Galen Shipman, and Lawerence Sorrillo. Multi-Tenant Isolation via Reconfigurable Networks. Tech. Report. Oak Ridge National Laboratory. ORNL/TM-2015/211.
4. Ferrol Aderholdt, Blake Caldwell, Susan Hicks, Scott Koch, Thomas Naughton, Daniel Pelfrey, James Pogge, Stephen L. Scott, Galen Shipman, and Lawerence Sorrillo. Review of Enabling Technologies to Facilitate Secure Compute Customization. Tech. Report. Oak Ridge National Laboratory. ORNL/TM-2015/210.

## **Service**

### **Technical Program Chair**

- OpenSHMEM 2018: The Fifth Workshop on OpenSHMEM and Related Technologies (OpenSHMEM 2018) – 2018

### **Program Committee**

- 11th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids – 2018
- 10th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids – 2017
- OpenSHMEM 2017: The Fourth Workshop on OpenSHMEM and Related Technologies (OpenSHMEM 2017) – 2017
- 9th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids – 2016
- OpenSHMEM 2016: The Third Workshop on OpenSHMEM and Related Technologies (OpenSHMEM 2016) – 2016
- 8th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids – 2015
- 7th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids – 2014
- 8th Cyber Security and Information Intelligence Research Workshop – 2013

### **Reviewer**

- 14th IEEE/ACM International Symposium on Cluster, Cloud, and Grid Computing (CCGrid 2014) – 2014
- 2nd Workshop on Dependability and Interoperability in Heterogeneous Clouds (DIHC 2014) – 2014



## Keith Jacks Gamble

Middle Tennessee State University  
Department of Economics and Finance  
Business and Aerospace N320  
MTSU Box 27  
Murfreesboro, TN 37132  
615-494-8613  
<http://capone.mtsu.edu/kgamble/>  
[Keith.Gamble@mtsu.edu](mailto:Keith.Gamble@mtsu.edu)

Chair of the Department of Economics and Finance  
Middle Tennessee State University, 2016-present  
Associate Professor of Finance  
Middle Tennessee State University, 2016-present  
Assistant Professor of Finance  
DePaul University, 2009-2016  
Lecturer of Economics  
Yale University, 2008-2009  
Whitebox Post-Doctoral Fellow  
Yale School of Management, 2008-2009

## EDUCATION

Ph.D. Economics, University of California, Berkeley, 2008  
A.B. Economics, *Magna Cum Laude*, Harvard College, 2003

## RESEARCH

**“Perspectives on ‘Cognitive Decline and Household Financial Decisions at Older Ages’ by Marco Angrisani and Jinkook Lee**  
*The Journal of the Economics of Ageing*, 2019, forthcoming.

**“Challenges for Financial Decision Making at Older Ages” in Financial Decision Making and Retirement Security in an Aging World**, Olivia S. Hammond, P. Brett Hammond, and Stephen P. Utkas, Eds. Oxford University Press, 2017.

**“Informed Short Selling around SEO Announcements”**  
with Sanjay Deshmukh and Keith Howe,  
*Journal of Corporate Finance*, 2017, 46, 121-138.

**“Informed Retail Investors: Evidence from Retail Short Sales”** with Wei Xu,  
*Journal of Empirical Finance*, 2017, 40, 59-72.

**“Aging and Financial Decision Making”**  
with Patricia A. Boyle, Lei Yu, and David Bennett,  
*Management Science*, 2015, 61(11), 2603-2610.

**“Short Selling and Firm Operating Performance”**  
with Sanjay Deshmukh and Keith Howe, *Financial Management*, 2015, 44(1), 217-236.

**“How Prior Outcomes Affect Individual Investors’ Subsequent Risk Taking”**  
with Bjorn Johnson, *Journal of Personal Finance*, 2014, 13(1), 8-37. (lead article)

**“The Information Content of Investors' Expectations for Risk and Return”**  
with Tom Berry, *Quarterly Journal of Finance*, 2013, 3(3&4).

**“Does Presenting Investment Results Asset by Asset Lower Risk Taking?”**  
with Santosh Anagol, *Journal of Behavioral Finance*, 2013, 14(4), 276-300.

**“Informed Local Trading Prior to Earnings Announcements”**  
with Tom Berry, *Journal of Financial Markets*, 2013, 16(3), 505-525.

**“Temporal Discounting is Associated with an Increased Risk of Mortality Among Older Persons without Dementia”**  
with Patricia A. Boyle, Lei Yu, and David Bennett, *PLOS ONE*, 2013, 8(6).

**“Poor Decision Making is a Consequence of Cognitive Decline among Older Persons without Alzheimer’s Disease or Mild Cognitive Impairment”**  
with Patricia A. Boyle, Lei Yu, Robert S. Wilson, Aron S. Buchman, and David Bennett, *PLOS ONE*, 2012, 7(8).

#### Research Fellowships, Grants, and Awards

Driehaus College of Business Summer Research Grant, 2012-2015  
Boston College Center for Retirement Research Sandell Grant, 2013-2014  
DePaul University Competitive Research Leave, 2013-2014  
Financial Management Association Best Paper Award Semifinalist, 2012  
DePaul University Competitive Research Grant, 2009-2010  
Whitebox Post-Doctoral Fellowship, Yale School of Management, 2008-2009  
Russell Sage Foundation Small Grant in Behavioral Economics, 2008  
Dean’s Normative Time Fellowship, 2007-2008  
Whitebox Behavioral Student Research Grant, 2007  
National Science Foundation Graduate Research Fellowship, 2004-2007

#### Research Presentations

Stanford/FINRA Foundation Conference on Financial Fraud, 2016  
Academy of Financial Services Annual Meeting, 2016  
Rush University ROS/MAP Investigators Meeting, 2012-2013, 2016  
The Wharton School Pension Research Council Symposium, 2016  
DePaul University, Finance Department 2009-2012, 2016  
Middle Tennessee State University, Jones College of Business, 2016  
Oberlin College, 2016  
Retirement Research Consortium Annual Meeting, 2014  
Midwest Finance Association Annual Meeting, 2012-2014  
European Finance Association Annual Meeting, 2013  
European Conference on Household Finance, 2013  
Netspar International Pension Workshop, 2013  
European Retail Investors Conference, 2013  
DePaul University, Economics Department 2013  
Financial Management Association Annual Meeting, 2012-2013

Rush University Neuroepidemiology Seminar, 2012  
College of William and Mary, Mason School of Business, 2009  
Georgetown University, 2009  
University of the South, 2009  
Yale School of Management, 2008  
University of California, Berkeley, 2008

## **TEACHING**

---

### Middle Tennessee State University

Business Finance (Honors)  
Business Finance (Online)  
Computer Applications in Finance  
Economics Seminar (PhD)  
Financial Modeling  
Internship in Finance  
Internship in Economics  
Microeconomics III (PhD)  
Personal Financial Planning  
Personal Financial Planning (Online)  
Thesis Advisor (Honors)

### Dissertation Chair

Inhwa Kim (2019)

### Dissertation Committee Member

A.T.M. Sayfuddin (2018-2019) – Randolph College  
Elvedin Bijelic (2018-2019)  
Mohammad Movahed (2018-2019)

### Honors Thesis Advisor

Abrial Goen (2018-2019) – Vanderbilt MSF  
Montgomery Barreto (2018-2019)

## Teaching Awards

Quality of Instruction Council Excellence in Teaching Award, DePaul University, 2013  
Lawrence W. Ryan Distinguished Teaching Award, Driehaus College of Business, 2013  
Allyn Young Teaching Prize, Harvard University, 2005  
Derek Bok Center Certificate for Distinction in Teaching, Harvard University, 2005  
Outstanding Graduate Student Instructor Award, University of California, Berkeley, 2004

Lisa Bloomer Green  
[lisa.green@mtsu.edu](mailto:lisa.green@mtsu.edu)  
5796 Napa Valley Dr.  
Smyrna, TN 37167

## **Education**

Ph. D.	Georgia Institute of Technology, Atlanta GA	Mathematics	2000
M. S.	Georgia Institute of Technology, Atlanta GA	Applied Mathematics	1996
B. A.	Goucher College, Towson MD	Mathematics and Computer Science (with honors in the major)	1994

## **Dissertation Title and Advisor**

"Random Probability Measures with Given Mean and Variance." Advisor: Professor Theodore P. Hill.

## **Current Research Interests**

Statistics Education; Curriculum Issues; Probability; Biostatistics.

## **Work Experience**

Associate Professor: Middle Tennessee State University, Murfreesboro, TN. August 2006-present.

Assistant Professor: Middle Tennessee State University, Murfreesboro, TN. August 2001- July 2006

Scientist: Naval Surface Warfare Center, Warfare Analysis Branch, Dahlgren, VA. May 2000-July 2001.

## **Teaching Experience**

Courses in Mathematical Statistics, Biostatistics, Introductory Statistics, Calculus, Pre-Calculus, Risk Management, Options Pricing, Business Calculus, and College Algebra.

## **Publications and Reports**

Yantz, Jennifer; Baum, Brittany; Beck, Jessie; Green, Lisa; Owens, David; Rowell, Ginger; Stephens, Chris. "The Development of an Instrument to Measure the Depth Of Science Experience (DOSE)." School Science and Mathematics. (in process).

Jeremy Strayer, Natasha Gerstenschlager, Lisa Green, Scott McDaniel, Ginger Rowell, "Towards a Full(er) Implementation of Active Learning." Statistics Education Research Journal. (Accepted)

Lisa Green, Nancy McCormick, Scott McDaniel, Ginger Holmes Rowell, and Jeremy Strayer. (2019) "Implementing Active Learning Department Wide: A Course Community for a Culture Change." Journal of Statistics Education. 26(3). P. 190-196. <https://doi.org/10.1080/10691898.2018.1527195>

Brittany Smith Baum, Ginger Holmes Rowell, Lisa Green, Jennifer Yantz, Jesse Beck, Thomas Cheatham, D. Christopher Stephens, and Donald Nelson. (2017) "Team-based Introductory Research Experiences in Mathematics." Problems, Resources, and Issues in Mathematics Undergraduate Studies (PRIMUS). P. 1-17.

<http://www.tandfonline.com/doi/full/10.1080/10511970.2016.1260079?scroll=top&needAccess=true>

J. Strayer, N. Gerstenschlager, G. Rowell, L. Green, N. McCormick, and S. McDaniel. (2016) University Statistics Instructors' Border Crossings: From Lecture to Active Learning. *Proceedings of the 38th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. p. 1013.

J. Strayer, N. McCormick, L. Green, S. McDaniel, G. Rowell, \*N. Gerstenschlager, and \*B. Hanson, (\* = Presenter) (2014) Observations of Implementations of Active Learning Modules in Introductory Statistics. *9th International Conference on Teaching Statistics. Conference Proceedings*. Flagstaff, AZ.

Gerstenschlager, N., Green, L., Hanson, B., McCormick, N., McDaniel, S., Rowell, G., & Strayer, J (2013). Introductory Statistics Students' Achievement in a Flipped-Concept Classroom Using Active Learning for Simple Linear Regression. *JSM Proceedings, Statistical Computing Section*. Alexandria, VA.

McDaniel, Green. (2012) Independent Interactive Inquiry-based Learning Modules using Audio-visual instruction in statistics. *Technology Innovations in Statistics Education (TISE)*, 6(1). <http://escholarship.org/uc/item/322385kq>.

McDaniel, Green (2012) Using Applets and Video Instruction to Foster Students' Understanding of Sampling Variability. *Technology Innovations in Statistics Education (TISE)*, 6(1). <http://escholarship.org/uc/item/1nh4n607>

## **Presentations**

Ken Blake, Lisa Green, Charles Apigian. (2019) Data Science at MTSU – Get Involved. *Panel Discussion at LT&ITC*, MTSU.

Lisa Green (2019). CBAS Teaching Series. *MTSU CBAS Teaching Award Speaker Series*. MTSU

L Green, N McCormick, S McDaniel, A Barlow (2016). Strategies for incorporating Active Learning in the Classroom. *MTSU Learning, Teaching, and Innovative Technology Center (LT&ITC) Teaching Presentations*. MTSU.

Green, L., McDaniel, S., McCormick, N., Rowell, G. (2016). A Flipped-Classroom Model in an Activity-based Introductory Statistics Course. *International Conference on Teaching College Mathematics*. Atlanta, GA

Green, L., McDaniel, S., McCormick, N., Strayer, J., Rowell, G. (2016). Addressing Challenges to Implementing Active Learning for All Sections of Introductory Statistics at a Large University. *Joint Statistics Meeting*. Chicago, IL.

Green, McDaniel, McCormick, Strayer, Rowell (2016). Creating a Course Community to Change the Teaching of Introductory Statistics at Middle Tennessee State University. *Tennessee STEM Education Research Conference*. Middle Tennessee State University, Murfreesboro, TN.

Green, McCormick & McDaniel (2016). In-class Activities and Out-of-class Videos with Embedded Quizzes Encourage Student Engagement. *Electronic Conference on Teaching Statistics* (e-COTS).

Strayer, J.F., Rowell, G.H., Green, L., McDaniel, S.N., McCormick, N., & Gerstenschlager, N.E. (2016). University statistics instructors' border crossings: From lecture to active learning. *38th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Tucson, AZ.

Green, McDaniel, & McCormick (2016). Using and Creating On-line Materials to Flip the Introductory Statistics Classroom. *Electronic Conference on Teaching Statistics* (e-COTS).

Green, L., McDaniel, S., McCormick, N., Strayer, J., Rowell, G., & Gerstenschlager, N. (2015). Changing the Teaching of Applied Statistics to Incorporate Activities which Promote Student Engagement for Success. *Tennessee STEM Education Research Conference*. Murfreesboro, TN.

Natasha Gerstenschlager. Other co-authors: Lisa Green, Scott McDaniel, Nancy McCormick, Jeremy Strayer (2015). Modules for Teaching Statistics with Pedagogies using Active Learning (MTStatPAL) as a part of a Flipped Classroom Model. *US Conference on Teaching Statistics (USCOTS)*. Pennsylvania State University.

## **Grants**

Green, L., McCormick, N., McDaniel, S., Rowell, G., and Strayer, J. (2015-Dec.2016) Extend MTStatPAL to Community Colleges: A Pilot Study. \$48,558. Supplement to the NSF grant (below) for MTStatPAL.

Green, L., McCormick, N., McDaniel, S., Rowell, G., and Strayer, J. (2015-2016) Active Learning in Introductory Statistics Faculty Learning Community. MTSU Course Revitalization Grant. \$12,000.

Green, L., McCormick, N., and Rowell, G. (2015-2016) MTStatPAL Workbook and Daily Integration Plan. 2015/16 Tennessee Board of Regents Course Revitalization Grants. \$13,500.

Green, L., McDaniel, S., Strayer, J, McCormick, N., & Rowell, G. (2013-2015) Modules for Teaching Statistics with Pedagogies using Active Learning (MTStatPAL), NSF. Approximately \$175,000

Green, L., McDaniel, S., & Rowell, G. (2012) Instructional Technologies Development Grant. Active Classroom Lesson Modules for MATH 1530. \$24,000.

Funded, then Augmented. *Cost Modeling for Telescopes*. NASA, \$8651, increased to total \$20,604, 5/18/09-5/17/12

Funded. *Discovery Learning via Pre-Learning in Statistics*. NSF (replaced co-PI in January 2007), \$75,000, 2005-2008

### **Consulting**

IncellDX (2015-2016) Biostatistical consulting, with Dr. Ping Zhang.

Prism Environmental Health and Safety Solutions, Inc. (2015) (Supervising student.)

Green, L., Rowell, G., Akoto, P., and Marume, T. S. (2014) Statistical Analysis of Particle Count Data for Surgical Clean Room Study. Report for the researchers. The researchers acknowledge us in their paper, in the ASHRAE journal.

### **Administrative Experience**

Interim Chair, Mathematical Sciences Department. 2018-2019.

Coordinator for Biostatistics Concentration of Master of Science in Professional Science Degree. January 2008-2018.

Chair of College of Basic and Applied Sciences Curriculum Committee (2015-2016)

### **Honors and Awards**

CBAS Teaching Excellence Award 2016.

Received the MTSU Foundation Outstanding Achievement in Instructional Technology Award 2014-2015.

Nominated for the Robert V. Hogg Award For Excellence in Teaching Introductory Statistics from the Special Interest Group of the Mathematical Association of America (SIGMAA) on Statistics Education. 2015.

**Don Hong**

Professor of Mathematical Sciences and Computational Science Ph.D. Program, Middle Tennessee State University

**(a) Professional Preparation**

Zhejiang Normal University	Ningbo China	Mathematics	BS (1981)
Zhejiang University	Hangzhou China	Mathematics	MS (1984)
Texas A&M University	College Station, TX	Mathematics	PhD (1993)
University of Texas	Austin, TX	Computational Math	8/1994-8/1996

**(b) Appointments**

- 2005-current, Professor of Mathematical Sciences, Middle Tennessee State University  
2002-16, Adjoint Professor of Mathematics, Vanderbilt University  
2003-07, Visiting Professor, Biostatistics of Cancer Research Center, Vanderbilt University  
2003-05, Professor of Mathematics, East Tennessee State University  
2001-02, Visiting Associate Professor of Mathematics, Vanderbilt University  
1999-2003, Associate Professor, Mathematics, East Tennessee State University  
1996-99, Assisnt Professor, Mathematics, East Tennessee State University

**(c) Five Related Publications**

1. L. Xiong and D. Hong, An MCMC-MRF Algorithm for Incorporating Spatial Information in IMS Proteomic Data Processing, In "*Statistical Analysis of Proteomics, Metabolomics, and Lipidomics Data Using Mass Spectrometry*," Datta, Susmita, Mertens, Bart J. A. (Eds.), Springer International Publishing, Switzerland, pp.81-99, 2017.
2. X. Yang, Q. Wu, JC. Zou, and D. Hong, Spatial Regularization for Multitask Learning and Application in fMRI Data Analysis, *British J. Math & Computer Science*, 14 (2016), 1-13.
3. J. Liang, D. Hong, F. Zhang, and J. Zou, IMSmining: A Tool for Imaging Mass Spectrometry Data Biomarker Selection and Classification, *Springer Proceedings in Mathematics & Statistics*, Volume 139: *Mathematics and Computing*, pp.155-162, 2015.
4. F. Zhang and D. Hong, Elastic Net Based Framework for Imaging Mass Spectrometry Data Biomarkers Selection and Classification, *Statistics in Medicine*, 30 (2011), 753768.
5. S. Chen, M. Li, D. Hong, D. Billheimer, B. Xu, and Y. Shyr, Mass Spectrometry Data Analysis: A Novel Comprehensive MS Data Preprocessing Method, *Bioinformatics*, 25 (2009), 808-814.

**Five Other Publications**

1. D. Hong and F. Zhang, Weighted Elastic Net Model for Mass Spectrometry Imaging Processing, *Math. Model. Nat. Phenom.*, Vol. 5, No. 3, 2010, pp. 115-133.
2. S. Chen, D. Hong, and Y. Shyr, Wavelet-Based Procedures for Proteomic MS Data Processing, *Computational Statistics & Data Analysis*, 52 (2007), 211-220.
3. C.K. Chui, D. Hong, and R.Q. Jia, Stability of optimal order approximation by bivariate splines over arbitrary triangulations, *Trans. of Amer. Math. Soc.*, 347 (1995), 3301-3318.
4. C.K. Chui and D. Hong, Construction of the local C1 quartic spline elements for optimal order approximation, *Math. Computation*, 65 (1996). 85-98.
5. C.K. Chui and D. Hong, Swapping edges of arbitrary triangulations to achieve the optimal order of approximation, *SIAM J. Numer. Anal.* 34 (1997) 1472-1482.

**(d) Synergistic Activities**

•**Editor Board** of *Frontiers in Applied Mathematics and Statistics-section Mathematics of Computation and Data Science, International Journal of Computational Mathematics, International Journal of Mathematics and Computer Science* and Guest Editor of *Journal of Computational and Applied Mathematics, Journal of Computational Analysis and Applications, and Journal of Concrete and Applicable Mathematics*

•**Recent Conference/AMS Special Sessions/Workshop Organizing:** (a). The 38th annual meeting of the SIAM SEA Section, mini-symposium on Imaging and Image Processing with Applications, Melbourne, Florida, March 29-30, 2014; (b). The 37th annual meeting of the SIAM Southeastern Atlantic Section, mini-symposium on Statistical Computing Methods for Imaging Data Processing, Oak Ridge National Laboratory and the University of Tennessee-Knoxville, March 22-24, 2013; (c) The 36th Annual SIAM Southeastern Atlantic Section Conference, mini-symposium on Computational Tools and Quantitative Methods for High Dimensional Data Analysis, University of Alabama in Huntsville, Huntsville, AL from March 24 - 25, 2012; (d) NSF Workshop on Quantitative Omics Data Analysis, MTSU, 2007.

•**Selected Invited Talks:** (1) Big Data and Techniques with Applications in Medical Image Processing, Seminar Talk at the Department of Mathematics and Statistics, Austin Peay State University, Clarksville, Tennessee. November 9, 2018; (2) Computational Learning Methods for Neuroimaging Data Analysis, Invited talk at Tsinghua Sanya International Mathematics Forum: From Approximation Theory to Real World Applications Workshop, Sanya, Hainan, China, December 11-15, 2017; (3) New IMS based proteomic, Invited talk at International Conference on Approximation Approaches for Big Data Analysis held at Zhejiang University, Hangzhou, China, December 10-14, 2016; (4) On Big Data Science and Medical Applications, Workshop on Images and Imaging, North China University of China, Beijing, China, June 25, 2015; (5) On High Dimensional Data Analysis with Applications in Medical Imaging and Images at High-Dimensional Data Analysis, Workshop held at the Department of Computer Science, Tennessee State University, Nashville, TN, April 16-17, 2015; (6) Statistical Computing Schemes for Hyper-spectral Type Data Processing in Medical Applications, at the International Conference on Learning and Approximation held at Fudan University, Shanghai, China, December 8-12, 2014; (7) On Hyper-spectral type Data Analysis and Applications, Invited Presentation at the International Conference on Approximation Theory and Applications, City University of Hong Kong, Hong Kong, May 20-24, 2013; (8) Statistical Approximation Methods for IMS data analysis, Invited Presentation at The 2nd Workshop on Biostatistics and Bioinformatics, Georgia State University, Atlanta, GA, May 10-12, 2013.

•**Review Panel** of (i) NIH Small Business Innovative Research (SBIR) Grant in Computational Biology and Software Development, 2008; (ii) NIH Challenge Grants in Health and Science Research, 2009.

•**Funded Projects:** (1) State of Tennessee Health Rate Review Project (Cycle-I&II), funded by Health and Human Services (HHS), 2011-2013, \$740,000.00 (PI); (2) NSF Mathematical Biology Program, Workshop on Quantitative Proteomics, DMS-0649753, \$5,000, 2007-2008 (PI); (3) NSA Grant 2005-06, Workshop on Mathematical Tools and Statistical Techniques for Quantitative Medical Data Analysis, October 13-14, 2005, \$15,250.00, (PI); (4) NSF IGMS Grant 2005-06, Wavelets and Splines in the study of the MALDI-TOF protein expression data for lung cancer and the survival analysis, \$99,999.00, (PI).

•**Chaired Graduate Thesis/Dissertation Committees**

**(1) Ph.D. Dissertations**

- (i) Lu Xiong, Dissertation Title: *Statistical Computing Schemes for Proteomics Data Processing and Insurance Solvency Modeling*, Ph.D. in Computational Sciences, MTSU, Graduation date: 12/2014.
- (ii) Xin Yang, Dissertation Title: *Machine Learning Techniques for High-dimensional Neuroimaging Data Analysis*, Ph.D. in Computational Sciences, MTSU, Graduation date: August 2015.
- (iii) Jingsai Liang, Dissertation Title: *Regularized Statistical Techniques for High Dimensional Medical Imaging Data Processing*, Ph.D. in Computational Sciences, MTSU, Graduation Date: May 2016.
- (iv) Filmon Gebreyesus, Computational Sciences program, expected graduation date: May 2019.
- (v) Gabriel Toban, Computational Sciences program, expected graduation date: August 2019.
- (vi) Shuzhe Xu, Computational Sciences program, expected graduation date: August 2020.

**(2) MS Theses:**

- Ye Fang, Predictive models for airshow ticket sales, MS in Mathematics, May 2018, MTSU.
- David G. Matthews, Data Mining and Machine Learning Algorithms for Workers' Compensation Early Severity Prediction, May 2016, MTSU.
- John D. Ihrie, *Web-based data mining tools for cancer research*, MSPS in Biostatistics, August 2011.
- Rong Lu, *A nonparametric phenotypic coding of the univariate family-based association test statistic in late times-to-onset analysis*, MS in Mathematics, May 2011.
- Zoe Zhang (**2011 Conference of Southern Graduate Schools Thesis Award Winner**), *Multivariate Analysis Methods for IMS Data Biomarker Selection and Classification*, MS in Mathematics, May 2010.
- Xingchen Yuan, Actuarial survival models of lung cancer patients, May 2005. ETSU.
- Shuo Chen, MALDI-TOF MS data processing using splines, wavelets, and clustering techniques, December, 2004. ETSU.
- Yong Chen, Thesis: Logspine density estimation and applications to survival data from cancer patients, Graduate Date: May 2004. ETSU.
- Xiaoyu Mu, Thesis: Ruin Probabilities with dependent forces of interest, August 2003, ETSU.
- Rusty Mawk, Splines in Statistics, August 2001. ETSU. First job: Actuary, Merastar Insurance Company, Chattanooga, TN.
- Renee Gaunt, Airline Revenue Optimization-A Multiple Linear Regression Model, December 2000. ETSU. First job: Actuary, Social Security Administration, Baltimore, MD.
- Jiansheng Cao, Minimum support of prewavelets over type-2 triangulations, August 2002. ETSU. First job: Actuarial Analyst, Lorraine Dorsa & Associates, Jacksonville Beach, FL.
- Qingbo Xue, Piecewise linear prewavelets over a regular triangulation, August 2002. ETSU. First job: Graduate Assistant (Ph.D. student), University of Central Florida, Orlando, FL.
- Andrew Sell, On a transportation problems, December 2000. ETSU. First Job: Actuary, Merastar Insurance Company, Chattanooga, TN.
- Lesley Baker, On Random Rates of Interest, August 2001. ETSU. First job: Actuary, Social Security Administration, Baltimore, MD
- Panrong Xiao, Image compression using bi-orthogonal spline wavelets, August 2001. ETSU. First job: Actuarial Analyst/DB Administrator, Lorraine Dorsa & Associates, Jacksonville Beach, FL.
- Hao Gu, MinImage: a wavelet compressor for still images, May 2000. ETSU. First job: Software Engineer, Firstlogic Inc., Raleigh, NC.
- Yuchun "Anna" Mu, Thesis: On construction of wavelets over triangulations, Graduate Date: August 1999. ETSU. First job: Actuary, The St Paul Companies, St. Paul, MN.
- Bradley Dyer, Optimal triangulation algorithm for bivariate splines and MatLab implementation, May 1999. ETSU. First job: Instructor, Department of Math and Computer Sciences, Hazard Community College, Hazard, KY.

# YEQIAN LIU

Phone:(501) 707-7993

Email: Yeqian.Liu@mtsu.edu

---

## EDUCATION

---

- **University of Missouri-Columbia** **Columbia, MO**  
2012 – 2016  
*Ph.D. in Statistics*
    - Advisor: Dr. Tony (Jianguo) Sun
  - **University of Arkansas at Little Rock** **Little Rock, AR**  
2009-2011  
*M.Sc in Mathematics*
  - **Beihang University** **Beijing, China**  
2004 – 2008  
*B.Sc in Mathematics*
- 

## RESEARCH INTERESTS

---

- **Statistics**
    - Biostatistics: Survival Analysis, Interval-Censored Data Analysis, Longitudinal Data Analysis, Semiparametric and Nonparametric Methods, Experimental Design
    - Bioinformatics: High Dimensional Data Analysis, Microarray Data Analysis, Machine Learning and Data Mining
    - Statistical Modeling: Generalized Linear Mixed Effect Model, Stochastic Process Analysis, Time Series, ANOVA
  - **Computer Skills**
    - SAS, R/Splus, Matlab, Maple, C, Winbugs, C++, L<sup>A</sup>T<sub>E</sub>X, SQL, Python
- 

## PROFESSIONAL EXPERIENCE

---

- **Department of Mathematical Sciences, Middle Tennessee State University** **Murfreesboro, TN**  
2016 – present  
*Assistant Professor*
  - Undergraduate Courses: Probability and Statistics (Spring 2017)  
College Algebra (Summer 2017), Calculus I (Fall 2017)  
Applied Statistics II (Spring 2018), Applied Statistics (Spring 2019)
  - Graduate Courses: Biostatistical Methods (Fall 2016), Introduction to Biostatistics (Fall 2016)  
SAS Programming (Spring 2017), Computational Statistics (Fall 2017)  
Advanced Biostatistical Methods (Spring 2018), Statistical Methods for Forecasting (Fall 2018)
- **Department of Statistics, University of Missouri** **Columbia, MO**  
2012 – 2016  
*Instructor & Teaching Assistant*
  - Teaching Assistant: Advanced Survival Analysis (Fall 2014)
  - Discussion Instructor: Elementary Statistics (Fall 2012, 2013, 2014 and Spring 2013, 2014, 2015),  
Introductory Statistical Reasoning (Fall 2015)
- **Division of Biometrics and Data Management, Novartis Oncology** **East Hanover, NJ**  
Summer 2015  
*Intern*
  - Improved the prediction of overall survival from progression free survival using joint model approach
  - Developed a new methodology for interim analysis in immuno-oncological clinical trials

- **Department of Mathematics and Statistics, University of Arkansas at Little Rock**      **Little Rock, AR**  
*Instructor & Teaching Assistant*      **2009 – 2012**
  - Teaching Assistant: Calculus I (Fall 2009), Calculus II (Spring 2010)
  - Independent Instructor: Elementary Algebra (Fall 2010, 2012 and Spring 2011), Intermediate Algebra (Summer 2010, 2011 and Fall 2011), Calculus I (Spring 2012)

---

## PUBLICATIONS

---

- Chen,X., Liu,Y., Sun.J., Zhou,Y. (2016). Quantile Regression in Semiparametric Varying-Coefficient Partially Linear Models under Length-Biased Sampling with Right Censoring. *Scandinavian Journal of Statistics*, **43(4)**, 921-938.
- Liu,Y., Hu, Tao., Sun, J.(2016). Regression Analysis of Current Status Data in the Presence of Cured Subgroup and Dependent Censoring. *Lifetime Data Analysis*. DOI:10.1007/s10985-016-9382-z.
- Liu,Y., Hu, T., Sun, J.(2017). A Class of Semiparametric Transformation Models for Doubly Censored Failure Time Data. *Biometrics*. doi:10.1080/02664763.2017.1466172.
- Liu,Y., Hu, T., Sun, J.(2018). Regression Analysis of Interval-Censored Failure Time Data with Cured Subgroup and Mismeasured Covariates. *Communications in Statistics-Theory and Methods*. doi:10.1080/03610926.2018.1535075
- Liu,Y. (2018) Using Propensity scores for comparing combination treatments with single agent arm in randomization study. *American Journal of Clinical and Experimental Medicine*. (Accepted)
- Liu,Y., Hu, T., Sun, J.(2018). A Sieve Semiparametric Maximum Likelihood Approach for Regression Analysis of Bivariate Interval-censored Failure Time Data with Mismeasured Covariate. *Biometrika* (submitted)
- Liu,Y., Roychoudhury, S. (2019) Improving the Prediction of Overall Survival using Joint Model Approach for Oncology Studies with Solid Tumor Response. *Journal of American Statistics Association*. (2019) (under revision)
- Liu,Y., Li, S., Sun, J.(2019). Semiparametric Mixture Cure Model with Partly Interval Censored Failure Time Data. *Statistics in Medicine*. (under revision)

---

## PROFESSIONAL PRESENTATIONS

---

- "Quantile Regression in Semiparametric Varying-Coefficient Partially Linear Models under Length-Biased Sampling with Right Censoring." Eastern North American Region (ENAR) Meetings, Maryland, Baltimore, March 2014. (contributed presentation)
- "Regression Analysis of Current Status Data in the Presence of Cured Subgroup and Dependent Censoring." Eastern North American Region (ENAR) Meetings, Florida, Miami, March 2015. (contributed presentation)
- "Regression Analysis of Interval Censored Data in the Presence of Cured Subgroup and Mismeasured Covariates." Eastern North American Region (ENAR) Meetings, Austin, Texas, March 2016. (contributed presentation)
- "Quantile Regression in Semiparametric Varying-Coefficient Partially Linear Models under Length-Biased Sampling with Right Censoring." Eastern Michigan University, March 2016. (invited)
- "Quantile Regression in Semiparametric Varying-Coefficient Partially Linear Models under Length-Biased Sampling with Right Censoring." Arkansas State University, March 2016. (invited)
- "A Class of Semiparametric Transformation Models for Doubly Censored Failure Time Data." University of Arkansas for Medical Sciences, April 2017. (invited)
- "Statistical Methods for the Analysis of Individual-Cell Data on Death and Division." Faculty Presentation at MTSU Scholar Week, March, 2018. (invited)

- "Regression Analysis of Interval-Censored Data in the Presence of Cured Subgroup and Measurement Error." The 6th Workshop on Biostatistics and Bioinformatics, Georgia, Atlanta, May 2018. (poster presentation)
- "Methods to Compare Phase I Efficacy Data of Combination Drug with Single Agent." International Conference on Mathematics and Statistics (ICOMAS 2018), Tennessee, Memphis, May 2018. (invited)

---

## RESEARCH GRANTS

---

- Middle Tennessee State University Faculty Research and Creative Activity Committee, "Statistical Methods for the Analysis of Individual-Cell Data on Death and Division", \$3,250, 01/01/2017-08/31/2017 (Principal Investigator).
- NIH proposal "Statistical Techniques for Regression Analysis of Censored Data with Cured Sub-population and Measurement Error", \$87,000, 2018, pending. (Principal Investigator).

---

## HONORS AND AWARDS

---

- University of Missouri Travel Fellowship 2014,2015
- Second Prize, National Undergraduate Mathematical Contest in Modeling 2007
- Global 200 in Microsoft's "ChallengE" Embedded Software Challenge 2006
- Distinguished Students of Beihang University 2005, 2006, 2007, 2008

---

## REPRESENTATIVE PROJECTS

---

- Application of OSCAR variable selection method for genetic pathway data
  - Conducted a simulation study for the proposed OSCAR method.
  - Showed that the proposed OSCAR method has better performance than LASSO, Ridge regression.
  - Found highly correlated genes within each pathway and grouped them into clusters by the software R.
  - Discussed the result and wrote a detailed report.
- Data augmentation and Bayesian methods for multiclass support vector machine
  - Proposed a multi-class support vector machine under the Bayesian framework to solve multivariate classification problems.
  - Wrote a full posterior likelihood.
  - Used EM, ECME and MCMC to do the parameter estimation.
  - Implemented our new methods by R to classify real data.
- Semiparametric likelihood estimation of the Clayton-Oakes model with multivariate current status data
  - Developed a sieve maximum likelihood approach for the estimation of the unknown parameter.
  - Constructed the sieves based on Bernstein polynomials.
  - Proposed an EM algorithm by treating the observable latent variable as missing values.
  - Conducted simulation studies to examine the finite sample performance of proposed methodology.

# CURRICULUM VITAE

## JOSHUA LEE PHILLIPS

1301 EAST MAIN STREET  
DEPARTMENT OF COMPUTER SCIENCE, MTSU Box 48  
MIDDLE TENNESSEE STATE UNIVERSITY  
MURFREESBORO, TN 37132  
**615.494.7965** ♦ [JOSHUA.PHILLIPS@MTSU.EDU](mailto:JOSHUA.PHILLIPS@MTSU.EDU)

### EDUCATION

<b>Ph.D. — Elec. Eng. and Comp. Sci.</b>	<b>University of California, Merced</b>	<b>2006-2012</b>
“Validation of Computational Approaches for Studying Disordered and Unfolded Protein Dynamics Using Polymer Models”		
Directed by Dr. Shawn Newsam & Dr. Michael E. Colvin. Read by Dr. Miguel Á. Carreira-Perpiñán and Dr. Ajay Gopinathan. GPA—4.00		
<b>M.S. — Computer Science</b>	<b>Vanderbilt University</b>	<b>2002-2004</b>
“Reinforcement Learning of Dimensional Attention for Categorization”		
Directed by Dr. David Noelle. Read by Dr. Thomas Palmeri. GPA—3.96		
<b>B. S. — Computer Science</b>	<b>Middle Tennessee State University</b>	<b>1998-2002</b>
Minors in mathematics and physics. Graduated magna cum laude. GPA—3.78		

### PUBLICATIONS

- Phillips, J. L., Harvey, S. P., and Gnanakaran, S. (in preparation). Hybrid experimental/simulation engineering of OPAA enhances nerve agent neutralization. *Enzyme and Microbial Engineering Technology*.
- Lopez-Bautista, C. A., Phillips, J. L., Berman, G. P., Sayre, R. T., and Gnanakaran, S. (in preparation). Capturing the CP29 conformational changes responsible for pH dependent non-photochemical quenching. *Scientific Reports*.
- Connors, K. A., Beasley, A., Barron, M., Belanger, S. E., Bonnell, M., Brill, J. L., de Zwart, D., Kienzler, A., Krailler, J., Otter, R., Phillips, J. L., and Embry, M. R. (2019). Creation of a curated aquatic toxicology database: EnviroTox. *Environmental Toxicology and Chemistry*. DOI:[10.1002/etc.4382](https://doi.org/10.1002/etc.4382)
- Morton, S. P., Phillips, J. B., and Phillips, J. L. (2019). Molecular basis of pH-dependent HIV gp120-CD4 interactions revealed. *Evolutionary Bioinformatics*. DOI:[10.1177/1176934319831308](https://doi.org/10.1177/1176934319831308)
- Jovanovich, M. P. and Phillips, J. L. (2018). N-task learning: solving multiple or unknown numbers of reinforcement learning problems. *Proceedings of the 40<sup>th</sup> Annual Meeting of the Cognitive Science Society*, Madison, WI. URL:<http://mindmodeling.org/cogsci2018/papers/0126/index.html>
- Morton, S. P., and Phillips, J. L. (2018). Sub-class differences of pH-dependent HIV GP120-CD4 interactions. *Proceedings of the 9<sup>th</sup> ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics*. DOI:[10.1145/3233547.3233711](https://doi.org/10.1145/3233547.3233711)
- Phillips, J. L., Colvin, M. E., and Newsam, S. (2018). Dimensionality estimation of protein dynamics using polymer models. *Proceedings of the 9<sup>th</sup> ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics*. DOI:[10.1145/3233547.3233713](https://doi.org/10.1145/3233547.3233713)
- Syzonenko, I., and Phillips, J. L. (2018). Hybrid spectral/subspace clustering of molecular dynamics simulations. *Proceedings of the 9<sup>th</sup> ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics*. DOI:[10.1145/3233547.3233595](https://doi.org/10.1145/3233547.3233595)

- Williams, A. S. and Phillips, J. L. (2018). Multilayer context reasoning in a neurobiologically inspired working memory model for cognitive robots. *Proceedings of the 40<sup>th</sup> Annual Meeting of the Cognitive Science Society*, Madison, WI. URL:<http://mindmodeling.org/cogsci2018/papers/0510/index.html>
- Muller, R. T., Travers, T., Cha, H.-J., Phillips, J. L., Gnanakaran, S., and Pos, K. M. (2017). Switch loop flexibility affects substrate transport of the AcrB efflux pump. *Journal of Molecular Biology*, 429 (24), 3863-3874. DOI:[10.1016/j.jmb.2017.09.018](https://doi.org/10.1016/j.jmb.2017.09.018)
- Morton, S. P., Phillips, J. B., and Phillips, J. L. (2017). High-throughput structural modeling of the HIV transmission bottleneck. In *Proceedings of the 2017 IEEE International Conference on Bioinformatics and Biomedicine Workshops (HPCB 2017)*, Kansas City, MO. DOI:[10.1109/BIBM.2017.8217952](https://doi.org/10.1109/BIBM.2017.8217952)
- Howton, J. and Phillips, J. L. (2017). Computational modeling of pH-dependent gp120-CD4 interactions in founder and chronic HIV strains. *Proceedings of the 8<sup>th</sup> ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics (CSBW 2017)*, 644-649. DOI:[10.1145/3107411.3107506](https://doi.org/10.1145/3107411.3107506)
- DuBois, G. M., and Phillips, J. L. (2017). Working memory concept encoding using holographic reduced representations. *Proceedings of the 28<sup>th</sup> Annual Modern Artificial Intelligence and Cognitive Science Conference*. URL:<http://ceur-ws.org/Vol-1964/NN3.pdf>
- Phillips, J. L., and Gnanakaran, S. (2015). A data-driven approach to modeling the tripartite structure of multidrug resistance efflux pumps. *Proteins: Struct., Funct., and Bioinform*, 83 (1), 46-65. DOI:[10.1002/prot.24632](https://doi.org/10.1002/prot.24632)
- Gottardo, R., Bailer, R. T., Korber, B. T., Gnanakaran, S., Phillips, J., Shen, X., Tomaras, G. D., Turk, E., Imholte, G., Eckler, L., Wenschuh, H., Zerweck, J., Greene, K., Gao, H., Berman, P. W., Francis, D., Sinangil, F., Lee, C., Nitayaphan, S., Rerks-Ngarm, S., Kaewkungwal, J., Pitisuttithum, P., Tartaglia, J., Robb, M. L., Michael, N. L., Kim, J. H., Zolla-Pazner, S., Haynes, B. F., Mascola, J. R., Self, S., Gilbert, P., Montefiori, D. C. (2013). Plasma IgG to linear epitopes in the V2 and V3 regions of HIV-1 gp120 correlate with a reduced risk of infection in the RV144 vaccine efficacy trial. *PLoS One*, 8(9):e75665. DOI:[10.1371/journal.pone.0075665](https://doi.org/10.1371/journal.pone.0075665)
- Stieh, D., Phillips, J. L., Rogers, P. M., King, D. F., Cianci, G. C., Jeffs, S. A., Gnanakaran, S., and Shattock, R. J. (2013). Dynamic electrophoretic fingerprinting of the HIV-1 envelope glycoprotein. *Retrovirology*, 10 (33). DOI:[10.1186/1742-4690-10-33](https://doi.org/10.1186/1742-4690-10-33)
- Phillips, J. L., Colvin, M. E., and Newsam, S. (2011). Validating clustering of molecular dynamics simulations using polymer models. *BMC Bioinformatics*, 12 (1), 445. DOI:[10.1186/1471-2105-12-445](https://doi.org/10.1186/1471-2105-12-445)
- Yamada, J., Phillips, J. L., Patel, S., Goldfien, G., Calestagne-Morelli, A., Huang, H., Reza, R., Acheson, J., Krishnan, V. V., Newsam, S., Gopinathan, A., Lau, E. Y., Colvin, M. E., Uversky V. N., and Rexach M. F. (2010). A bimodal distribution of two distinct categories of intrinsically-disordered structures with separate functions in FG nucleoporins. *Molecular and Cellular Proteomics*, 9, 2205-2224.
- Lau, E. Y., Phillips, J. L., and Colvin, M. E. (2009). Molecular dynamics simulations of highly charged green fluorescent proteins. *Molecular Physics: An International Journal at the Interface Between Chemistry and Physics*, 107 (8), 1233-1241. DOI:[10.1080/00268970902845305](https://doi.org/10.1080/00268970902845305)
- Phillips, J. L., Colvin, M. E., Lau, E. Y., and Newsam, S. (2008). Analyzing dynamical simulations of intrinsically disordered proteins using spectral clustering. In *Proceedings of the 2008 IEEE International Conference on Bioinformatics and Biomedicine Workshops (WCSB)*, Philadelphia, PA. DOI:[10.1109/BIBMW.2008.4686204](https://doi.org/10.1109/BIBMW.2008.4686204)
- Tugcu, M., Wang, X., Hunter, J. E., Phillips, J., Noelle, D., and Wilkes, D. M. (2007). A computational neuroscience model of working memory with application to robot perceptual learning. In *Proceedings of the 3<sup>rd</sup> International Conference on Computational Intelligence*, Banff, Alberta, Canada. URL:<http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.119.3407>
- Phillips, J. L., and Noelle, D. C. (2006). Working memory for robots: inspirations from computational neuroscience. In *Proceedings of the 5<sup>th</sup> International Conference on Development and Learning*, Bloomington, IN.

Phillips, J. L., and Noelle, D. C. (2005). A biologically inspired working memory framework for robots. In *Proceedings of the 14<sup>th</sup> IEEE International Workshop on Robot and Human Interactive Communication*, Nashville, TN. DOI:[10.1109/ROMAN.2005.1513845](https://doi.org/10.1109/ROMAN.2005.1513845)

Phillips, J. L., and Noelle, D. C. (2005). A biologically inspired working memory framework for robots. In *Proceedings of the 27<sup>th</sup> Annual Meeting of the Cognitive Science Society*, Stresa, Italy.  
URL:<http://csjarchive.cogsci.rpi.edu/proceedings/2005/docs/p1750.pdf>

Phillips, J. L., Kogekar, S., and Adams, J. A. (2004). Emergency automated response system (EARS). In *Proceedings of the 48<sup>th</sup> Annual Meeting of the Human Factors and Ergonomics Society*, New Orleans, LA.  
URL:<http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.129.3334>

Phillips, J. L., and Noelle, D. C. (2004). Reinforcement learning of dimensional attention for categorization. In *Proceedings of the 26<sup>th</sup> Annual Meeting of the Cognitive Science Society*, Chicago, IL.  
URL:<http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.122.7278>

## FUNDED GRANTS

Otter, R. R. (PI) and Phillips, J. L. (coPI), (09/01/2018-12/31/2018). Optimization and accessibility of the ecoTTC database (MTSU Grant Index Number 537031 - extension). *Health and Environmental Sciences Institute*, \$40k.

Ding, W. (PI), Leander, R. (coPI), Robertson, W. (coPI), and Phillips, J. L. (coPI), (02/01/2018-01/31/2022). Computational modeling and simulation in the applied sciences. (MTSU Grant Index Number TBD). *NSF REU*, \$232k.

Dong, Z. (PI), Oslund, E. (coPI), Pettey, C. (coPI), and Phillips, J. L. (coPI), (02/01/2018-01/31/2022). Computer science plus plus (CS++) (MTSU Grant Index Number TBD). *NSF S-STEM*, \$1M.

Otter, R. R. (PI), Carroll, H. D. (coPI), and Phillips, J. L. (coPI), (07/21/2016-12/01/2017). Optimization and accessibility of the ecoTTC database (MTSU Grant Index Number 537031). *ILSI Health and Environmental Sciences Institute*, \$26k.

## POSTERS

Williams, A. S. and Phillips, J. L. (2018). Multilayer context reasoning in a neurobiologically inspired working memory model for cognitive robots. *40<sup>th</sup> Annual Meeting of the Cognitive Science Society*, Madison, WI.

Howton, J., and Phillips, J. L., (2017). Computational modeling of pH sensitivity in the critical HIV GP120-CD4 interaction. *61st Annual Meeting of the Biophysical Society*, New Orleans, LA.

Phillips, J. L., Ganguly, K., Wren, M., Gupta, G., McMahon, B. H., Wall, M. E., and Gnanakaran, S. (2014). Systems level study of bacterial multi-drug resistance efflux machinery. *58th Annual Meeting of the Biophysical Society*, San Francisco, CA.

Phillips, J. L., and Gnanakaran, S. (2013). An experimentally driven multiscale study of bacterial efflux machinery. *7th Annual Q-Bio Conference*, Santa Fe, NM.

Phillips, J. L., and Gnanakaran, S. (2013). Coarse-grained simulations of the MexAB-OprM multidrug resistance efflux pump. *57th Annual Meeting of the Biophysical Society*, Philadelphia, PA.

Phillips, J. L., Lau, E. Y., Colvin, M. E., and Newsam, S. (2012). Dimensionality estimation of disordered protein dynamics. *56th Annual Meeting of the Biophysical Society*, San Diego, CA.

Phillips, J. L., Lau, E. Y., Colvin, M. E., and Newsam, S. (2010). Dimensionality reduction reveals differences between disordered protein dynamics and early-stage protein folding dynamics. *24th Annual Symposium of the Protein Society*, San Diego, CA.

Phillips, J. L., Lau E. Y., Rexach, M., Newsam, S., and Colvin, M. E. (2010). Differences between unfolded and disordered protein dynamics. *1st Gordon Research Conference on Intrinsically Disordered Proteins*, Davidson, SC.

Phillips, J. L., Lau E. Y., Krishnan, V. V., Rexach, M., Newsam, S., and Colvin, M. E. (2010). Metric scaling for dimensionality reduction of disordered protein dynamics. *54th Annual Meeting of the Biophysical Society*, San Francisco, CA. (**2010 Student Research Achievement Award**)

Phillips, J. L., Manilay, J. O., and Colvin, M. E. (2010). Analytic parameter fitting in stochastic stem cell models. *54th Annual Meeting of the Biophysical Society*, San Francisco, CA.

Phillips, J. L., Lau E. Y., Krishnan, V. V., Rexach, M., Newsam, S., and Colvin, M. E. (2009). Dynamics analysis of unstructured FG-nucleoporins. *23rd Annual Symposium of the Protein Society*, Boston, MA. (**2009 Best Student Poster Award**)

Phillips, J. L., Lau E. Y., Krishnan, V. V., Rexach, M., Newsam, S., and Colvin, M. E. (2008). Characterizing intrinsically disordered FG-nucleoporins using molecular dynamics. *22nd Annual Symposium of the Protein Society*, San Diego, CA.

## INVITED TALKS

Jovanovich, M. P. and Phillips, J. L. (July 27, 2018). N-task learning: solving multiple or unknown numbers of reinforcement learning problems. *40<sup>th</sup> Annual Meeting of the Cognitive Science Society*, Madison, WI.

Morton, S. P., and Phillips, J. L. (Aug 29, 2018). Sub-class differences of pH-dependent HIV GP120-CD4 interactions. *9<sup>th</sup> ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics (CSBW 2018)*, Washington, DC.

Phillips, J. L., Colvin, M. E., and Newsam, S. (Aug 29, 2018). Dimensionality estimation of protein dynamics using polymer models. *9<sup>th</sup> ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics (CSBW 2018)*, Washington, DC.

Syzonenko, I., and Phillips, J. L. (Aug 31, 2018). Hybrid spectral/subspace clustering of molecular dynamics simulations. *Proceedings of the 9<sup>th</sup> ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics*, Washington, DC.

Morton, S. P., Phillips, J. B., and Phillips, J. L. (Nov 13, 2017). High-throughput structural modeling of the HIV transmission bottleneck. *2017 IEEE International Conference on Bioinformatics and Biomedicine Workshops (HPCB 2017)*, Kansas City, MO.

Howton, J. and Phillips, J. L. (Aug 20, 2017). Computational modeling of pH-dependent gp120-CD4 interactions in founder and chronic HIV strains. *8<sup>th</sup> ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics (WCSB 2017)*, Boston, MA.

DuBois, G. M. and Phillips, J. L. (April 28, 2017). Working memory concept encoding using holographic reduced representations. *28<sup>th</sup> Modern Artificial Intelligence and Cognitive Science Conference (MAICS 2017)*, Fort Wayne, IN.

Phillips, J. L., and Gnanakaran, S. (March 20, 2015). All-atom modeling and geometric simulations of efflux pumps.. *Los Alamos National Laboratory LDRD #20140121DR External Review*, Los Alamos, NM.

Phillips, J. L., Harvey, S. P., and Gnanakaran, S. (March 19, 2014). Molecular dynamics simulations of organophosphorus acid anhydride interactions with V-type organophosphate nerve agents. *247th American Chemical Society National Meeting and Symposium*, Dallas, TX.

Phillips, J. L. (October 10, 2013). High-throughput electrostatic surface potential calculations of HIV envelope proteins. *Center for Nonlinear Studies, Los Alamos National Laboratory*, Los Alamos, NM.

Phillips, J. L., Pos, K. M., and Gnanakaran, S. (April 4, 2013). Multidrug efflux at multiple scales. *Center for Nonlinear Studies, Los Alamos National Laboratory*, Los Alamos, NM.

Phillips, J. L., Colvin, M. E., Gopinathan, A., and Newsam, S. (October 4, 2012). Polymer models for the validation of dimensionality estimation of disordered protein dynamics. *Center for Nonlinear Studies, Los Alamos National Laboratory*, Los Alamos, NM.

Phillips, J. L. (July 12, 2012). Validation of computational approaches for studying disordered and unfolded protein dynamics using polymer models (dissertation defense). *School of Engineering, University of California*, Merced, CA.

Phillips, J. L., Colvin, M. E., Gopinathan, A., and Newsam, S. (April 19, 2012). Validating quantitative analysis methods for molecular simulations using polymer models. *Computational Biology Research Group, Dept. of Comp. Sci., University of California*, Davis, CA.

Phillips, J. L., Colvin, M. E., Gopinathan, A., and Newsam, S. (September 7, 2011). Machine learning approaches for characterizing disordered protein dynamics. *Center for Nonlinear Studies, Los Alamos National Laboratory*, Los Alamos, NM.

Phillips, J. L., Lau E. Y., Newsam, S., and Colvin, M. E. (March 7, 2011). Probing the conformation landscape of the unfolded state: do disordered and unfolded dynamics differ? *55th Annual Meeting of the Biophysical Society*, Baltimore, MD.

Phillips, J. L. (September 3, 2010). Computational approaches for quantifying disorder in biopolymers. *Electrical Engineering and Computer Science Seminar Series, University of California*, Merced, CA.

Phillips, J. L., Newsam, S., Lau E. Y., and Colvin, M. E. (August 9, 2009). Analyzing dynamical simulations of intrinsically disordered proteins. *San Diego Supercomputer Center*, San Diego, CA.

Phillips, J. L., Colvin, M. E., Lau E. Y., and Newsam, S. (May 21, 2009). Analyzing dynamical simulations of intrinsically disordered proteins. *Center for Molecular Biophysics, Oak Ridge National Laboratory*, Oak Ridge, TN.

Phillips, J. L., Colvin, M. E., Lau E. Y., and Newsam, S. (November 03, 2008). Analyzing dynamical simulations of intrinsically disordered proteins using spectral clustering. *IEEE Bioinformatics and Biomedicine 2008 (WCSB 2008)*, Philadelphia, PA.

Phillips, J. L. (August, 10, 2008). Quantifying the dynamics of intrinsically disordered proteins. *Theoretical and Computational Biophysics Group, Beckman Institute, University of Illinois*, Urbana-Champaign, IL.

## HONORS

- 2012 Nicholas C. Metropolis Postdoctoral Fellowship (Los Alamos National Laboratory)
- 2012 Outstanding Graduate Student Award in Comp. Sci. (University of California, Merced)
- 2012 Selected for St. Jude Children's Research Hospital's National Graduate Student Symposium
- 2010 University of California, Merced Graduate Research Council Travel Award
- 2010 Biophysical Society Student Research Achievement Award
- 2010 Pittsburgh Supercomputing Center National Resource for Biomedical Supercomputing Award (Co-PI)
- 2009 Protein Society Best Student Poster Award
- 1998 Middle Tennessee State University Presidential Scholarship
- 1998 Square-D Computer Science Scholarship
- 1998 Middle Tennessee State University Freshman Computer Science Award

## PROFESSIONAL AFFILIATIONS

- Association for Computing Machinery
- Cognitive Science Society

## SERVICE

- 2019 Reviewer for IEEE Transactions on Computational Biology and Bioinformatics
- 2019 Reviewer for Molecules (MDPI)

2018	NSF Grant Review Panelist
2017	Reviewer for ACM Southeast
2015	Reviewer for Entropy
2014	Workshop Lecturer for the Eighth Annual Q-Bio Summer School
2013	Workshop Lecturer for the Seventh Annual Q-Bio Summer School
2013	Poster Judge for Los Alamos Summer Student Symposium
2011	Ad-hoc Reviewer for Journal of Biomolecular Structure and Dynamics
2010-2012	UC Merced Graduate Student Association Secretary
2009	Reviewer for Computational Structural Biology Workshop (IEEE BIBM)
2008-2009	Lecturer, UC Merced Center for Computational Biology, Undergraduate Research and Mentoring Program
2008	Reviewer for 2009 IEEE RO-MAN

## PROFESSIONAL EXPERIENCE

### **Assistant Professor**

**Middle Tennessee State University**

**2014-**

Develop and deliver course instruction for graduate and undergraduate courses. Conduct research both independently and collaboratively.

### **N. C. Metropolis Postdoctoral Fellow Los Alamos National Laboratory**

**2012-2014**

Conducted research both independently and in collaboration with laboratory staff.

### **Teaching Assistant**

**University of California, Merced**

**2010**

Developed and delivered lecture materials focused on developing upper-division computational skills for biomolecular simulation. Oversaw computer labs and provided student support. Graded all relevant lab reports and tests.

### **Lecturer**

**University of California, Merced**

**2007**

Presented lower-division computer science course material. Developed test and quiz materials. Assisted students with homework assignments and concepts related to the course.

### **Research Assistant**

**University of California, Merced**

**2006-2012**

Conducted research both independently and in collaboration with faculty, graduate students, and undergraduate students. Submitted and presented work for publication in peer-reviewed conference proceedings and journals.

### **Research Assistant**

**Vanderbilt University**

**2003-2006**

Conducted research both independently and in collaboration with faculty, graduate students, and undergraduate students. Submitted and presented work for publication in peer-reviewed conference proceedings.

### **Teaching Assistant**

**Vanderbilt University**

**2002**

Assisted students with homework assignments and concepts related to their computer science courses. Oversaw computer lab and provided student support. Coordinated with other assistants to fulfill students' needs and university goals.

### **Web Programmer/Designer**

**Middle Tennessee State University**

**2001-2002**

Developed web interface for online computer science laboratory manuals. Developed web programs to gather usage statistics.

# Curriculum Vita

## Scott J. Seipel, Ph.D.

### **Office**

Department of Computer Information Systems  
Middle Tennessee State University  
Box 45  
Murfreesboro, Tennessee 37132  
615.898.2707  
Scott.Seipel@mtsu.edu

### **Home**

2011 Creekwalk Drive  
Murfreesboro, Tennessee 37130  
615.962.0750

### **Education**

#### **Ph.D. The University of Texas at Arlington (UTA)**

Ph.D. in Business Administration, 1998  
Major: Statistics (Management Science)  
Minors: Industrial Engineering  
Research Methods  
Dissertation: Data Envelopment Analysis: A Statistical Test of Efficiency under Heterogeneous Error

#### **M.B.A. Graduate Work**

University of Texas at Austin  
Concentration: Operations Management / Information Systems

#### **B.B.A. The University of Texas at Arlington**

Bachelor of Business Administration, August 1985  
Major: Accounting  
Concentration: Accounting Systems

### **Academic Experience**

#### **Middle Tennessee State University (MTSU)**

Associate Professor  
Department of Computer Information Systems  
August 2000 to present

**Murfreesboro, Tennessee**

#### **Texas Christian University (TCU)**

Visiting Assistant Professor of Decision Sciences  
Department of Finance and Decision Sciences  
August 1999 to May 2000

**Fort Worth, Texas**

#### **University of Texas at Arlington (UTA)**

Visiting Assistant Professor of Information Systems  
Department of Information Systems and Management Science  
January 1999 to August 1999

**Arlington, Texas**

### **Principle Areas of Expertise**

Business Intelligence and Data Analytics  
Data Analysis including Categorical, Nonparametric, and other Robust Statistical Techniques  
Decision Modeling and Simulation  
Stochastic Data Envelopment and Efficiency Analysis  
Structural Equation Modeling  
Computer Programming  
Pedagogical Issues

## **Instructional Experience**

### **Graduate**

Predictive Analytics and Data Mining  
Business Intelligence  
Applied Business Analytics  
Computer-Based Decision Modeling  
Quantitative Methods Survey  
Quantitative Computer Applications Seminar  
Introductory Data Analysis  
Advanced Statistical Methods in Business Administration

### **Undergraduate**

Introduction to Business Analytics  
Decision Science Techniques  
Business Statistics I  
Business Statistics II  
Advanced Business Computer Programming  
Operations Management

Full Member – MTSU Graduate Faculty

Robert McLean Distinguished Assistant Professor, 2005-2006

Nominated for Outstanding Faculty Member in the School of Business, 2004-2005

Midgett Faculty Excellence Award – 2014-2015

## **Statistical Experience**

### **Private Consulting**

- ArcSys – Development of business intelligence system for prediction of non-performing loans
- Bridgestone/Firestone Corp. - Provided analysis and modeling of a complex issue on a high profile pre-legal matter.
- Transcender, LLC – Provided expert testimony in legal case involving computer forensic issues.
- Choice Homes, Inc. – Evaluation and estimation of year-end work-in-process accruals and the creation of performance evaluation and cost control methods.
- Texas Department of Criminal Justice and the Attorney General of the State of Texas (in conjunction with Mary M. Whiteside, Ph.D.) - Analyzed data and refuted claims of racial bias in a high profile case involving promotional testing procedures in the Texas Rangers law enforcement group.
- Attorney General of the State of Texas (in conjunction with Mary M. Whiteside, Ph.D.) - Defended Attorney General's office in a racial reverse-gender discrimination lawsuit.
- Texas Department of Protective and Regulatory Services and the Attorney General of the State of Texas (in conjunction with Mary M. Whiteside, Ph.D.) - Analyzed data and provided statistical support in defense of current trans-racial adoption policies.
- Bell Helicopter - Statistically analyzed and created a model for predicting yoke beam bending in rotors based on data captured from available sensors on military helicopters.
- Texas Department of Criminal Justice and the Attorney General of the State of Texas (in conjunction with Mary M. Whiteside, Ph.D.) - Investigated and refuted claims of age and reverse-gender discrimination in defense of management promotional policies.
- Gage Marketing Group, et al. - (in conjunction with Mary M. Whiteside, Ph.D.) - Defended underwriting insurance company against prize claim in the Lloyd's of London indemnity of a promotional scratch-off game sponsored by Shell Oil Co. Defense was based on increased odds of winning from change in the playing piece distribution.

- Burlington Northern - Analyzed safety performance measures for the evaluation of corporate divisions. Additional work was performed in the determination and modeling of important and predictive factors in railway accidents.
- North Texas Council of Governments - Trained traffic engineers in the use of statistics in collecting and analyzing data on traffic flow.
- Bruce Pauley (plaintiff attorney) - (in conjunction with Mary M. Whiteside, Ph.D.) - Investigated claims of racial discrimination in the management promotional policies of Racetrac gas chain.
- Total Human Resources - Analyzed data, identified factors, and created a model to predict successful managers for Battleground Restaurants, Inc. a large North Carolina based restaurant holding company.
- Recognition International, Inc. (in conjunction with Mary M. Whiteside, Ph.D.) - Investigated data and supported testimony before the Texas Comptroller's Office and the State Sales Tax Commission on the statistical validity of sales tax collection on missing invoices.
- Arlington Chamber of Commerce - Statistically analyzed and reported results of the 1995 Arlington Business Survey.

## **Publications in Scholarly Journals**

Brooks, N. G. and Seipel, S. J., "Grit and the Information Systems Student: A Discipline-Specific Examination of Perseverance and Passion for Long Term Goals," *Information Systems Education Journal*, (2018).

Burch, T., Seipel, S. J., Coyle, N., Ortega, K. H., and DeJesus, O., "Postoperative Visual Analog Pain Scores and Overall Anesthesia Patient Satisfaction," *Pain Management*, (2017)

Seipel, S. J., "Perfectionism in Students: Do Accountants Want to be More Perfect," *Insight into a Changing World*, (2015).

Otter, R., Seipel, S. J., Graeff, T., Alexander, B., Boraiko, C., Gray, J., Peterson, K., and Sadler, K., "Comparing student and faculty perceptions of online and traditional courses," *The Internet and Higher Education*, (2013).

James, K., and Seipel, S. J., "The Effects of Decreased User Confidence on Perceived Internal Audit Fraud Protection," *Journal of Forensic Accounting*, (2010).

Anshel, M.H., and Seipel, S. J., "Combined Effect of a Self-Monitoring and Fitness Coaching Intervention on Selected Measures of Aerobic and Strength Fitness and Exercise Adherence," *Journal of Sports Behavior*, (2008).

Anshel, M.H. and Seipel, S.J. "Relationships between Perfectionism and Social Physique Anxiety among Male and Female College Student Exercisers," *Perceptual and Motor Skills*, (2007).

Anshel, M.H. and Seipel, S.J. "Relationships between Dimensions of Perfectionism and Exercise Behavior among College Students," *International Journal of Sport and Exercise Psychology*, (2006).

Foote, D.A., Seipel, S.J., Johnson, N.B., and Duffy, M.K. "Employee Commitment and Organizational Policies," *Management Decision*, (2005).

Seipel, S.J. and Apigian, C.H., "Perfectionism in Students: Implications in the Instruction of Statistics," *Journal of Statistical Education*, (2005).

Seipel, S.J. "Supporting an Information Systems Curriculum with a Management Science Course," *ACET Journal of Computer Education and Research*, (2005).

Talluri, S., Whiteside, M., and Seipel, S.J., "A Nonparametric Stochastic Procedure for FMS Evaluation," *European Journal of Operational Research*, (2000).

**1. Contact Information:**

Address: Department of Mathematical Sciences, Middle Tennessee State University,  
1301 East Main Street, Murfreesboro, TN 37132, USA  
Tel: 615-898-2053 (O); Email: [qiang.wu@mtsu.edu](mailto:qiang.wu@mtsu.edu)

**2. Academic Appointments:**

Associate Professor	July 2015 – Present
Assistant Professor	Aug. 2011– July 2015 Middle Tennessee State University, Department of Mathematical Sciences Computational Science PhD Program
Lecturer (Assistant Professor)	Jan. 2011–Aug. 2011 University of Liverpool, UK
Visiting Assistant Professor	Aug. 2008–Aug. 2010 Michigan State University
Postdoctoral Research Associate	Sept. 2005–Aug. 2008 Duke University

**3. Education:**

Ph.D. in Mathematics	July 2005	City University of Hong Kong
M.Sc. in Mathematics	June 2000	Beijing Normal University, China
B.Sc. in Mathematics	June 1997	Yantai University, China

**4. Qualifications:**

Associate of the Society of Actuaries (ASA): 2014

**5. Awards**

MTSU Distinguished Research Award, 2018

**6. Research Interests:**

Machine Learning, Statistics, Computational Harmonic Analysis, High Dimensional Data Mining, and Applications (in Computational Biology, Biomedical Sciences, Risk Managements, etc).

**7. Publications:** 1 book; 54 peer reviewed journal/conference papers; 7 preprints and technical reports; and 5 other publications.**Book:**

Qiang Wu, *Classification and Regularization in Learning Theory*, VDM Verlag, 2009.

**Journal/Conference Papers:**

- (1) Ting Hu, Qiang Wu, and Ding-Xuan Zhou, Distributed kernel gradient descent algorithm for minimum error entropy principle, *Applied and Computational Harmonic Analysis*, 2019, accepted.

- (2) Fangchao He and Qiang Wu, Bias corrected regularization kernel method in ranking, *Analysis and Applications*, 17(1), 2019, 1-17.
- (3) Zhengchu Guo, Lei Shi and Qiang Wu, Learning Theory of Distributed Regression with Bias Corrected Regularization Kernel Network, *Journal of Machine Learning Research*, 18(118), 2017, 1-25.
- (4) Qiang Wu, Bias corrected regularization kernel network and its applications, in *2017 International Joint Conference on Neural Networks (IJCNN)*, pages 1072-1079.
- (5) Hongzhi Tong and Qiang Wu, Learning performance of regularized moving least square regression, *Journal of Computational and Applied Mathematics* 325 (2017), 42-55.
- (6) Xin Yang\*, Qiang Wu, Don Hong and Jiancheng Zou, Spatial regularization for neural network and application in Alzheimer's disease classification, *Future Technologies Conference 2016*, pages 831-836. (\*PhD student)
- (7) Ting Hu, Qiang Wu and Ding-Xuan Zhou, Convergence of gradient descent for minimum error entropy principle in linear regression, *IEEE Transactions on Signal Processing*, 64(24), 2016, 6571-6579.
- (8) C. A. Micchelli, M. Pontil, Qiang Wu, and D. X. Zhou, Error bounds for learning the kernel, *Analysis and Applications*, 14(6), 2016, 849-868.
- (9) Xin Yang\*, Qiang Wu, J. Zou, D. Hong, Spatial Regularization for Multitask Learning and Application in fMRI Data Analysis, *British Journal of Mathematics & Computer Science*, 14(4), 2016. Article no. BJMCS.23829 (\*PhD student)
- (10) T. Hu, J. Fan, Qiang Wu, and D.X. Zhou, Consistency analysis of an empirical minimum error entropy algorithm, *Applied and Computational Harmonic Analysis*, 41 (2016), 164-189.
- (11) Yin L\*, Wu Q, Hong D (2016) Statistical Methods and Software Package for Medical Trend Analysis in Health Rate Review Process. *J Health Med Inform* 7:219. doi:10.4172/2157-7420.1000219 (\*Master student)
- (12) Ye (Zoe) Ye\*, Qiang Wu, and Don Hong, Tail Conditional Expectations for Extended Exponential Dispersion Models, *American Research Journal of Mathematics*, Volume 1, Issue 4, 2015, 28-33. (\*Master student)
- (13) H. Sun and Qiang Wu, Sparse representation in indefinite kernel machines, *IEEE Transactions on Neural Networks and Learning Systems*, **26**:10 (2015), 2576-2582.
- (14) D. Mao, Qiang Wu and Y. Wang, A new approach for physiological time series, *Advances in Adaptive Data Analysis*, Vol. 7, No. 1 (2015) 1550001 (13 pages).
- (15) T. Hu, J. Fan, Qiang Wu and D.X. Zhou, Regularization schemes for minimum error entropy principle, *Analysis and Applications*, **13**:(4), (2015), 437-455.
- (16) X. Hu, Y. Wang, and Qiang Wu, Multiple authors detection: a quantitative analysis of *Dream of the Red Chamber*, *Advances in Adaptive Data Analysis*, **6**:4 (2014), Article ID 1450012 (18 pages), DOI: 10.1142/S1793536914500125.

- (17) Qiang Wu, F. Liang and S. Mukherjee, Kernel sliced inverse regression: regularization and consistency, *Abstract and Applied Analysis*, volume 2013, Article ID 540725, 11 pages.
- (18) H.W. Sun and Qiang Wu, Indefinite kernel network with dependent sampling, *Analysis and Applications*, **11**:5 (2013), 1350020 (15 pages).
- (19) T. Hu, J. Fan, Qiang Wu, and D.X. Zhou, Learning Theory Approach for minimum error entropy criterion, *Journal of Machine Learning Research*, **14** (2013), 377-397.
- (20) Qiang Wu, Regularization Networks with Indefinite Kernels, *Journal of Approximation Theory*, **166** (2013), 1-18.
- (21) J. M. Huges, D. Mao, D. N. Rockmore, Y. Wang and Qiang Wu, Empirical Mode Decomposition analysis for visual stylometry, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, **34**:11 (2012), 2147-2157.
- (22) Y. Ying, Qiang Wu and C. Campbell, Learning the Coordinate Gradients, *Advances in Computational Mathematics*, **37**:3, (2012), 355-378.
- (23) Y. Wang and Qiang Wu, Sparse PCA by iterative elimination algorithm, *Advances in Computational Mathematics*, **36** (2012), 137–151.
- (24) H. W. Sun and Qiang Wu, Least square regression with indefinite kernels and coefficient regularization, *Applied and Computational Harmonic Analysis*, **30**:1 (2011), 96–109.
- (25) Qiang Wu, F. Liang and S. Mukherjee, Localized sliced inverse regression, *Journal of Computational and Graphical Statistics*, **19**:4 (2010), 843-860. (This is an extended version of the paper published in NIPS conference proceedings in 2009.)
- (26) J. Guinney, Qiang Wu, S. Mukherjee, Estimating variable structure and dependence in multi-task learning via gradients, *Machine Learning*, **83**:3 (2011), 265–287.
- (27) Qiang Wu, J. Guinney, M. Maggioni, S. Mukherjee, Learning gradients: predictive models that infer geometry and dependence, *Journal of Machine Learning Research*, **11** (2010), 2175–2198.
- (28) S. Mukherjee, Qiang Wu and D. X. Zhou, Learning gradients on manifolds, *Bernoulli*, **16**:1 (2010), 181-207.
- (29) Qiang Wu, F. Liang and S. Mukherjee, Localized sliced inverse regression, *Advances in Neural Information Processing Systems*, **21**, (2009), 1785–1792.
- (30) H.W. Sun and Qiang Wu, A note on application of integral operator in learning theory, *Applied and Computational Harmonic Analysis*, **26** (2009), 416–421.
- (31) H.W. Sun and Qiang Wu, Application of integral operator for regularized least-square regression., *Mathematical and Computer Modelling*, **49**, no. 1-2, (2009), 276-285.
- (32) H.W. Sun and Qiang Wu, Regularized least square regression with dependent samples, *Advances in Computational Mathematics*, **32** (2010), 175–189. (Published online September 2008, DOI: 10.1007/s10444-008-9099-y.)
- (33) Qiang Wu and D. X. Zhou, Learning with sample dependent hypothesis spaces, *Computers and Mathematics with Applications*, **56** (2008), 2896–2907.

- (34) N. Phalai, Qiang Wu, F. Liang, S. Mukherjee and R. L. Wolpert, Characterizing the function space for Bayesian kernel models, *Journal of Machine Learning Research*, **8** (2007), 1769–1797.
- (35) Qiang Wu, Y. M. Ying and D. X. Zhou, Multi-kernel regularized classifiers, *Journal of Complexity*, **23** (2007), 108–134.
- (36) S. Mukherjee and Qiang Wu, Estimation of gradients and coordinate covariation in classification, *Journal of Machine Learning Research*, **7** (2006), 2481–2514.
- (37) Qiang Wu, Y. M. Ying and D. X. Zhou, Learning rates of least-square regularized regression, *Foundations of Computational Mathematics*, **6**:2 (2006), 171–192.
- (38) Qiang Wu, Y. M. Ying and D. X. Zhou, Learning theory: from regression to classification, in “*Topics in Multivariate Approximation and Interpolation*”, 257–290, K. Jetter et al editors, Amsterdam; Boston: Elsevier, 2006.
- (39) Qiang Wu and D. X. Zhou, Analysis of support vector machine classification, *Journal of Computational Analysis and Applications*, **8**:2 (2006), 99–119.
- (40) Qiang Wu and D. X. Zhou, SVM soft margin classifiers: linear programming versus quadratic programming, *Neural Computation*, **17** (2005), 1160–1187.
- (41) D. R. Chen, Qiang Wu, Y. M. Ying and D. X. Zhou, Support vector machine soft margin classifiers: error analysis, *Journal of Machine Learning Research*, **5** (2004), 1143–1175.
- (42) S. Z. Lu and Qiang Wu, CBMO estimates for multilinear singular integrals, *Math. Nach.*, **276** (2004), 75–88.
- (43) S. Z. Lu and Qiang Wu, Endpoint estimates for certain commutators of fractional and singular integrals, *Proc. Amer. Math. Soc.*, **131** (2003), 467–477.
- (44) S. Z. Lu, Qiang Wu, and D. C. Yang, Boundedness of commutators on Hardy type spaces, *Sci. China (Ser. A)*, **45** (2002), 984–997.
- (45) Qiang Wu and D. C. Yang, On fractional multilinear singular integrals, *Math. Nach.*, **239** (2002), 215–235.
- (46) Y. B. Pan, Qiang Wu, and D. C. Yang, A remark on multilinear singular integrals with rough kernels, *J. Math. Anal. Appl.*, **253** (2001), 310–321.
- (47) Qiang Wu and D. C. Yang, Boundedness of multilinear operators on Herz type spaces: extreme cases. *Acta Math. Sin. (Engl. Ser.)* 21 (2005), no. 1, 81–94.
- (48) Qiang Wu, Weighted estimates for multilinear Calderón-Zygmund operators. *Adv. Math. (China)* 33 (2004), no. 3, 333–342.
- (49) S. Z. Lu, Y. Meng and Qiang Wu, Lipschitz estimates for multilinear singular integrals. II. *Acta Math. Sci. Ser. B Engl. Ed.* 24 (2004), no. 2, 291–300.
- (50) Y. Ding, Qiang Wu, and D. C. Yang, Weighted  $(L^p, L^q)$  estimates for multilinear oscillatory singular integrals. *Southeast Asian Bull. Math.* 27 (2003), no. 2, 241–265.

- (51) Qiang Wu, Lipschitz estimates for multilinear singular integrals. *Northeast. Math. J.* 19 (2003), no. 4, 351–365.
- (52) S. Z. Lu, Qiang Wu, and D. C. Yang, Uniform  $(L^p, L^q)$  boundedness of multilinear oscillatory singular integrals. *Progr. Natur. Sci. (English Ed.)* 10 (2000), no. 10, 744–753.
- (53) S. Z. Lu, Qiang Wu, and D. C. Yang, Weighted uniform boundedness of multilinear oscillatory singular integrals. *Journal of Beijing Normal University (Natural Science)* 36 (2000), no. 2, 143–148.
- (54) G. E. Hu, Qiang Wu and D. C. Yang, Boundedness of multilinear oscillatory singular integrals on Hardy type spaces. *Hiroshima Math. J.* 30 (2000), no. 2, 301–315.

**Preprints and Technical Reports:**

- (1) Song Cui, Qiang Wu, James West, and Jiangping Bai Machine Learning-based Microarray Analyses Indicate Low-expression Genes Might Collectively Influence PAH Disease, preprint, 2018.
- (2) Ning Zhang and Qiang Wu, Online learning for supervised dimension reduction. 2018 preprint.
- (3) Ning Zhang, Zhou Yu and Qiang Wu, Overlapping sliced inverse regression for dimension reduction, preprint, 2017.
- (4) Hongzhi Tong and Qiang Wu, Moving quantile regression, preprint 2016.
- (5) Ting Hu, Qiang Wu and Ding-Xuan Zhou, Kernel gradient descent algorithm for information theoretic learning, preprint, 2016.
- (6) Qiang Wu, Bias correction for regularized regression and application in learning with streaming data, preprint 2015.
- (7) Qiang Wu and S. Mukherjee, Variable selection and dimension reduction by learning gradients, Tech Report, ISDS, Duke University, August 2008.

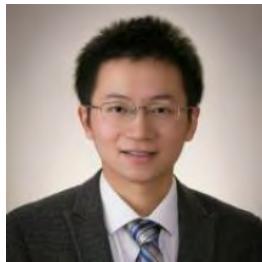
**Other Publications:**

- (1) Book Chapter, Xiangfeng Hu, Yang Wang, and Qiang Wu, Stylometry and Mathematical Study of Authorship. In A. Aldroubi et al. (eds.), *New Trends in Applied Harmonic Analysis, Applied and Numerical Harmonic Analysis*, pp 281-300. Springer International Publishing Switzerland 2016. DOI 10.1007/978-3-319-27873-5\_8
- (2) Editorial paper, Ding-Xuan Zhou, Qiang Wu, Yiming Ying, Learning Theory, *Abstract and Applied Analysis*, Volume 2014, Article ID 138960, 2 pages, <http://dx.doi.org/10.1155/2014/138960>
- (3) Abstract, Ye Ye, Le Yin, Don Hong, Qiang Wu, Trend Analysis Algorithms and Applications to Health Rate Review, *The 48th Actuarial Research Conference*, 2013, pp. 44-45. [http://d3iovvmfe1okdrz.cloudfront.net/cms/wp-content/uploads/2013/07/ARC-Program-Binder-Full-0809\\_2013.pdf](http://d3iovvmfe1okdrz.cloudfront.net/cms/wp-content/uploads/2013/07/ARC-Program-Binder-Full-0809_2013.pdf)

- (4) RATE REVIEW REPORT for Tennessee Department of Commerce and Insurance (TDCI): Health Insurance Rate Review Project, by Program of Actuarial Science, Middle Tennessee State University, September 2012.
- (5) Extended abstract, A Learning Theory Perspective on the Empirical Minimum Error Entropy Principle, in *Learning Theory and Approximation*, Oberwolfach Report 31/2012, page 1905-1907.

## 8. Student supervision

- Ning Zhang, PhD, Middle Tennessee State University, 2019 (expected)
- Xin Yang, PhD, Middle Tennessee State University, 2016, (*Co-supervised with Prof. Don Hong*)  
PhD Dissertation: *Machine Learning Techniques for High-dimensional Neuroimaging Data*
- Honglan Xu, MS, Middle Tennessee State University, 2018  
Mater Thesis: *A Comparative Study on Two Strategies for Distributed Classification*
- Danielle Baghernejad, MS, Middle Tennessee State University, 2016.  
Master Thesis: *Analysis of MTSU Student Retention Data*
- Le Yin, MS, Middle Tennessee State University, 2014.  
Master Thesis: *Medical Trend Analysis Methods*
- Ye Ye, MS, Middle Tennessee State University, 2014.  
Master Thesis: *Tail Conditional Expectation for Extended Exponential Dispersion Models*



# Lu Xiong, Ph.D.

**Assistant Professor in Actuarial Science at Middle Tennessee State University**

MTSU Box 34, Murfreesboro, TN 37130 • 615-898-5471 •

[lu.xiong@mtsu.edu](mailto:lu.xiong@mtsu.edu)

---

## » Summary

Research interests in computational actuarial science, by applying machine learning, data science and predictive modeling in areas like workers comp, healthcare system cost reduction, insurance companies' solvency rating etc. Strong quantitative and computational background in Data Science, Predictive Modeling, Machine Learning, Actuarial Science and Healthcare Analytics. Postdoc researches focus on biomedical data processing, analytics, software engineering using cloud computing, Python, R on computational analytical information system development. PhD research focused on the statistical modeling for Bioinformatics data processing, and solvency prediction of general insurance companies. Three years of working experience as an Actuarial Analyst in the P&C consulting environment. Passed 5 preliminary exams of Society of Actuaries (SOA) and expect to obtain Associate of the Society of Actuaries (ASA) in 2019. Received postdoc training in Computational Metabolomics at Emory University, building cloud software, database and Machine Learning algorithms for analytics in Bioinformatics Big Data.

---

## » Education & Postdoc training

**Emory University**, Atlanta, GA

Postdoc fellow in Computational Metabolomics, 10/1/2017 – 7/31/2018

**Middle Tennessee State University**, Murfreesboro, TN

Ph.D. in Computational Science, 12/13/2014

**Middle Tennessee State University**, Murfreesboro, TN

Master of Science in Mathematics concentrated in Actuarial Science, May 2014

**Beijing University of Posts and Telecommunications**, Beijing, China

Bachelor of Management in Information Management and Information System, July 2010

---

## » Research & Work Experience

### **Assistant Professor**

Middle Tennessee State University, Murfreesboro, TN. *August 2018 - Present.*

- Conduct research in Computational Actuarial Science, and advise students to do researches in the related area.
- Teach Actuarial courses. Supervise students' research in predictive modeling.

### **Postdoctoral Research Fellow**

Emory University, Atlanta, GA. *October 2017-July 2018.*

- Research in Bioinformatics and Computational Metabolomics, including responsibilities of coordinating research projects, analysis, and presentation of

scientific data. Use Jupyter Notebook, Python/R and software in Mass Spectrometry to process and analyze metabolomics and clinical data. Algorithms used include principal component analysis (PCA), Bayesian inference, Spearman's rank correlation, t-test, regression. Python/R packages used include pandas, scikit-learn, rpy2, Bioconductor. Building the server version of Mummichog, a free Python program for analyzing data from high throughput, untargeted metabolomics, using Ubuntu Server, Apache2, Flask, WSGI. Building a new online database in Metabolomics for research community to use, to accelerate the pace of medical discovery. Use Docker Container, Amazon Web Services (AWS) and Google App Engine to develop more powerful software in Bioinformatics.

### **Data Analyst**

ATATA, Nashville, TN. *April 2017-September 2017.*

- Work closely and collaborate with products owners, software developers, and designers to create data-driven applications.
- Perform research, data collection, statistical data analysis on sets of data, including sets of data that are financially driven.
- Use Python, R, Matlab or other similar technologies to run analysis on data collected.
- Build and maintain predictive analytics models by using modern software and technologies to create recommendation results for our customers, such as recommended stock picks for a stock market, the optimal flow of tasks in a project, or suggesting products to add to a shopping cart.
- Generate reports about the data analysis to stakeholders and make recommendations accordingly.

### **Actuarial Analyst**

SIGMA Actuarial Consulting Group, Nashville, TN. *January 2015 - March 2017.*

- Work with brokers, underwriters to support the business decision using analytics.
- Complete actuarial projects in Workers Comp, General Liability, Product Liability, Auto Liability, Property Liability and Medical Malpractice. Perform actuarial analysis for IBNR, Loss Forecasting, Reserve Analysis, Confidence Interval Analysis etc.
- Develop Workers Compensation Early Severity Prediction (WorkCompESP) model.
- Develop LORAN (Loss Run Analytics), a graphical data representation analytical tool for the insurance industry.
- Use PHP+MySQL, JavaScript, HTML+CSS and WAMP to help web development of risk66.com, SIGMA's new data analytical website.
- Supervised an intern to start his research project in SIGMA. Now he is continuing that project in AAA headquarter.

### **Research Internship**

SIGMA Actuarial Consulting Group, Brentwood, TN. *April 2014 - November 2014.*

- Actuarial consulting projects.
- Research in Captive insurance company financial health rating modeling.
- Research in Strategic Risk Analysis. Build a Moto Carlo simulation programing using MATLAB+VBA+Excel.

---

## » **Teaching Experience**

### **Adjunct Professor**

Middle Tennessee State University, Murfreesboro, TN. *January 2015 - May 2015.*

- Taught Actuarial Science course (Exam P – Probability) [ACSI 4140/5140 Mathematical Foundations of Actuarial Science](#) for both graduate and undergraduate students.

### **Instructor**

Middle Tennessee State University, Murfreesboro, TN. *January 2013 - December 2014.*

- Taught College Mathematics for Managerial, Social, and Life Sciences (MATH-1630). Start from Fall 2013, taught 2 sessions per semester. Each session has around 25 students.

### **Math Tutor**

Middle Tennessee State University, Murfreesboro, TN. *September 2010 - December 2012.*

- Tutor in Math Lab for Statistics and Calculus.

### **Teaching Assistant**

Middle Tennessee State University, Murfreesboro, TN. *September 2010 - December 2012.*

- Grade homework for professors in Linear Algebra, Calculus.

## » Research Interests

Machine Learning, Predictive Modeling, Cloud Computing, Computational Actuarial Science, Software Engineering for Actuarial Science, Computational Metabolomics, High-dimensional Data Analysis, Monte Carlo Simulation, Scenario Test, Stress Test, Medical Data Analysis, Public Healthcare Actuarial Research, Epidemiology Data Analytics.

## » Actuarial Exams passed

- SOA Exam P (CAS Exam 1) - Probability, passed in Nov 2010 (Candidate ID: 85534).
- SOA Exam FM (CAS Exam 2/FM) - Financial Mathematics, passed in Feb 2011 (Candidate ID: 10121).
- SOA Exam MLC (CAS Exam LC, ST) - Models for Life Contingencies, passed in Nov 2011 (Candidate ID: 67557).
- SOA Exam C (CAS Exam 4/C) - Construction and Evaluation of Actuarial Models, passed in Feb 2013 (Candidate ID: 39325).
- SOA Exam MFE (CAS Exam 3/F) - Models for Financial Economics, passed in Nov 2015 (Candidate ID: 82638).
- VEE - Corporate Finance, VEE - Statistics, VEE - Microeconomics

## » Paper Submitted/Proceedings

- Lu Xiong, Don Hong and Tim Coomer, *Using Monte Carlo Simulation to Predict Captive Insurance Solvency*. Submitted to Variance Journal on 10/11/2018.
- Lu Xiong and Don Hong (2017), *An MCMC-MRF Algorithm for Incorporating Spatial Information in IMS Proteomic Data Processing*, in Susmita Datta, Bart J. A. Mertens (Eds.), *Statistical Analysis of Proteomics, Metabolomics, and Lipidomics Data Using Mass Spectrometry* (pp. 81-99). Switzerland: Springer International Publishing.
- Lu Xiong and Don Hong, *Multi-resolution Analysis Method for IMS Data Biomarker Selection and Classification*, British Journal of Mathematics and Computer Science, 5 (2015) 65-81.
- Lu Xiong, *Statistical Computing Schemes for Proteomics Data Processing and Insurance Solvency Modeling*, Middle Tennessee State University JEW Library, December 2014. (Ph.D. Dissertation)

# Zhijiang Dong

<http://www.cs.mtsu.edu/~zdong>

Computer Science Dept., Middle Tennessee State university, Murfreesboro, TN 37127  
Phone: (615) 904-8428 Email: Zhijiang.Dong@mtsu.edu

<b>Research Interest</b>	Software engineering. Specialized areas of interest: verification and validation, formal method, runtime verification, software architecture, and agent-oriented software engineering. Other interests include computer science education.	
<b>Education</b>	<p>Florida International University, Miami, FL <i>Ph.D</i> in Computer Science Aug. 2006 Thesis title: A Framework for Transforming, Analyzing, and Realizing Software Designs in Unified Modeling Language Advisor: Xudong He</p> <p>Huazhong University of Science &amp; Technology, Wuhan, P.R.China <i>M.S.</i> in Computer Science June 1997 Thesis title: Semantic Inter-operation in Distributed Multimedia DBMS DM2 Advisor: Yucai Feng</p> <p>Huazhong University of Science &amp; Technology, Wuhan, P.R.China <i>B.S.</i> in Applied Mathematics June 1994 Minor: Computer Science Thesis title: Optimized Arrangement of Two Dimension Non-regular Objects</p>	
<b>Employment</b>	<p><i>Professor</i>, Aug. 2018 to present Middle Tennessee State University, Murfreesboro, TN</p> <p><i>Associate Professor</i>, Aug. 2012 to Aug. 2018 Middle Tennessee State University, Murfreesboro, TN</p> <p><i>Assistant Professor</i>, Aug. 2006 to Aug. 2012 Middle Tennessee State University, Murfreesboro, TN</p> <p><i>Graduate Assistant</i>, Aug. 2000 to Aug. 2005 Florida International University, Miami, FL</p>	
<b>Grants</b>	<ul style="list-style-type: none"><li>[1] Zhijiang Dong, Eric Oslund, Chrisila Pettey, Joshua Phillips. <i>NSF S-STEM Scholarship Program: Computer Science Plus Plus (CS ++)</i>. \$999,968. Funded by NSF S-STEM (DUE-1104000, 02/01/2018 - 01/31/2023).</li><li>[2] Zhijiang Dong. <i>A Runtime Checker with Evolutionary Algorithm Decision Making</i>. \$275,607. Funded by AFRL BAA-RIK-13-06 (2015 - 2017).</li><li>[3] Zhijiang Dong. <i>Knowledge Database of Syntax Errors for CS1 and CS2 Students</i>. \$6,000. Funded by MTSU ITDC Committee (2012 Summer).</li><li>[4] Thomas J Cheatham, Zhijiang Dong, Judith A Hankins, Cen Li, and Brenda Parker. <i>IMPACT: Increasing Minority Participation and Access to Computing in Tennessee</i>. \$552,630. Not funded by NSF CCF-Broadening Participation in Computing (2010 - 2012).</li><li>[5] Thomas J Cheatham, Welch David, Zhijiang Dong, Jian Fu, and Cen Li. <i>PIIT: Partners for Innovation in Information Technology</i>. \$599,962. Funded by NSF PFI (IIP-0917840, 2009 - 2012).</li></ul>	

- [6] Cen Li, Zhijiang Dong, and Roland Untch. *Promoting Peer Collaboration Through PeerSpace A Novel Online Social Network Based Learning Environment*. \$149,745. Funded by NSF CCLI (DUE 0837385, 2009 - 2012).
- [7] Jungsoon Yoo, Suk Seo, Sung Yoo, Chrisila Pettey and Zhijiang Dong. *Intelligent Algorithm Development Tutor*. \$149,888. Funded by NSF CCLI (DUE-0737257, 2008 - 2011).
- [8] Richard C Detmer, Zhijiang Dong, and Cen Li. *CPATH: Proposal for Research for Experience (RET) Supplement*. \$25,000. Funded by NSF CPATH (IIS-0937423, 2009 - 2010).
- [9] Richard C Detmer, Zhijiang Dong, and Cen Li. *ProjectMT – A Real-World, Project-Based Computer Science Curriculum*. \$149,777. Funded by NSF CPATH(CNS-0829609, 2008 - 2010).
- [10] Cen Li and Zhijiang Dong. *Developing a Social Network based Online Programming and Exercises Environment (SNOPEE) to Enhance Learning*. \$2000.00. Project. Funded by MTSU STEPmt Curriculum Development (2008 Summer).
- [11] Zhijiang Dong. *A Formal Approach to Specify and Analyze Dynamic Software Architectures*. 4 credit hours (\$8,631). Funded by MTSU Faculty Research and Creative Projects Committee (2007 Summer)

**Refereed Publications**

- [1] Y. Fu, Zhijiang Dong, X. He. *Formal Modeling and Analysis of Collaborative Humanoid Robotics*. International Journal of Robotics Applications and Technologies (IJRAT) 6(1): 34-54 (2018).
- [2] X. He, Zhijiang Dong, and Y. Fu. *A Systematic Approach for Developing Cyber Physical Systems*. In proceedings of the 30th International Conference on Software Engineering and Knowledge Engineering, pages 456-461. San Francisco Bay, CA. July 1-3, 2018.
- [3] X. He, Zhijiang Dong, H. Yin, and Y. Fu. *A Framework for Developing Cyber Physical Systems*. International Journal of Software Engineering and Knowledge Engineering (IJSEKE), Vol. 27, Issue 9&10, December 2017.
- [4] X. He, Zhijiang Dong, H. Yin, and Y. Fu. *A Framework for Developing Cyber Physical Systems*. In proceedings of the 29th International Conference on Software Engineering and Knowledge Engineering, pages 236-241. Pittsburgh, PA. July 5-7, 2017. (Runner-up for Best Paper Award)
- [5] Zhijiang Dong and Y. Fu. *Runtime Verification on Robotics Systems*. International Journal of Robotics Applications and Technologies. Vol. 3, No. 1, 2015.
- [6] J. Yoo, S. Yoo, S. Seo, Zhijiang Dong, and C. Pettey. *Teaching Algorithm Development Skills*. International Journal of Advanced Computer Science, Vol 3, No. 9, Pp. 466-474, September 2013.
- [7] J. Yoo, S. Yoo, and Zhijiang Dong, *Mobile App Development Course for Teaching OOD*. World Conference on Educational Multimedia, Hypermedia and Telecommunications (ED-MEDIA2013). Victoria, British Columbia. June 24-27, 2013
- [8] C. Li, Zhijiang Dong, R. Untch, and M. Chasteen, N. Reale. *Engaging Computer Science Students through Gamification in an Online Social Network based Collaborative Learning Environment*. International Journal of Information and Education Technology (IJIET), Vol. 3, No. 1, February 2013
- [9] C. Li, Zhijiang Dong, R. Untch, and D. Jagadeesh. *Developing An Interactive Practice Tool In PeerSpace for First Year Computer Science*. International Journal of Information and Education Technology (IJIET), Vol. 3, No. 1, February 2013
- [10] Y. Fu, N. Yama, Zhijiang Dong. *Formal Modeling and Analysis of Mobile Robotics System Using Z*. International Conference on Software Engineering Research and Practice, Las Vegas, NV. July 16 - 19, 2012.

- [11] C. Li, *Zhijiang Dong*, R. Untch, and M. Chasteen. *Facilitating Peer Code Review in an Online Collaborative Learning Environment for Computer Science Students*. 2012 International Conference on Frontiers in Education: Computer Science and Computer Engineering. Las Vegas, NV. July 1619, 2012.
- [12] J. Yoo, S. Yoo, S. Seo, *Zhijiang Dong*, and C. Pettey. *Can We Teach Algorithm Development Skills?*. 50th ACM Southeast Conference. Tuscaloosa, AL. March 29-31, 2012.
- [13] C. Li, *Zhijiang Dong*, R. Untch, and M. Chasteen. *PeerSpace An Online Collaborative Learning Environment for Computer Science Students*. 11th IEEE International Conference on Advanced Learning Technologies, Athens, GA, USA. July 6-8, 2011. (**Best Paper Award**)
- [14] C. Li, *Zhijiang Dong*, R. Untch, N. Reale, and M. Chasteen. *PeerSpace: An Online Peer-Collaborative Learning Environment for First Year Computer Science Students*. 9th International Conference on Computer-Supported Collaborative Learning (CSCL 2011), Hong Kong, China, July 4-8, 2011.
- [15] Y. Fu, *Zhijiang Dong*, X. He. *Architecture-Centered Integrated Verification*. Chapter of Book: Modern Software Engineering Concepts and Practices: Advanced Approaches. Editor: Ali H. Dogru and Veli Bier. Publisher: IGI Global. ISBN: 9781609602154. September 2011.
- [16] *Zhijiang Dong*, C. Li, and R. Untch. *Build Peer Support Network for CS2 Students*. 49th ACM Southeast Conference. Kennesaw, GA. March 24-26, 2011.
- [17] C. Li, *Zhijiang Dong*, and R. Untch. *Preparation Station: A Practice Tool in an Online Social Network-Based Collaborative Learning Environment*. 49th ACM Southeast Conference. Kennesaw, GA. March 24-26, 2011.
- [18] Y. Fu, S. Li, S. Bhattacharjee, and *Zhijiang Dong*. *Integrated Model-based Test Case Generation*. *International Journal of Advanced Research in Computer Science*. Vol 1, No. 3, 2010.
- [19] R. Detmer, C. Li, *Zhijiang Dong*, and J. Hankins. *Incorporating Real-World Projects in Teaching Computer Sciences Courses*. 48th ACM Southeast Conference. Oxford, MS. April 15 17, 2010.
- [20] Y. Fu, *Zhijiang Dong*, Phil Bording, Xudong He. *Towards rewriting semantics of software architecture specification*. Chapter of Book: Petri Nets: Applications. Editor: Paweł Paelewski. Publisher: InTech. ISBN: 978-953-307-047-6. February 2010.
- [21] Y. Fu, *Zhijiang Dong*, J. Ding, X. He, V. Atluri, and S. Li. *Modular Analysis of Software Architecture Model*. *International Conference on Software Engineering Research and Practice*. page 17-23. Las Vegas, NV. July 13 16, 2009.
- [22] C. Pettey, S. Seo, J. Yoo, S. Yoo, and *Zhijiang Dong*. *A Tool for Promoting Algorithm Development in Introductory CS Classes*. World Conference on Educational Multimedia, Hypermedia and Telecommunications (ED-MEDIA2009). Honolulu, Hawaii, USA. June 22-26, 2009.
- [23] J. Yoo, *Zhijiang Dong*, S. Yoo, S. Seo, and C. Pettey. *Improving Student Performance by Enforcing Algorithm Development*. World Conference on Educational Multimedia, Hypermedia and Telecommunications (ED-MEDIA2009). Honolulu, Hawaii, USA. June 22-26, 2009.
- [24] C. Li, *Zhijiang Dong*, and R. Untch. *PeerSpace: A Social Networking Environment That Promotes Peer Learning Amongst College Students*. The 14th Annual Instructional Technology Conference. Murfreesboro, TN. March 29-31, 2009.
- [25] Y. Fu, *Zhijiang Dong*, J. Ding, and X. He. *Mapping Software Architecture Specification to Rewriting Logic*. The 8th International Conference on Quality Software. Oxford, UK, 12-13 August 2008.

- [26] *Zhijiang Dong, Y. Fu, and X. He. Formalizing UML Architecture Description.* Chapter of the book "Petri Net: Theory and Application", ISBN 978-3-902613-12-7. Editor Vojdran Kordic, Aleksandar Lazić, and Munir Merdan. I-Tech Education and Publishing, Vienna, Austria, European Union, 2007
- [27] Y. FU, *Zhijiang Dong, and X. He. An Approach to Validating Translation Correctness From SAM to Java .* In proceedings of the 19th International Conference on Software Engineering and Knowledge Engineering. Boston, USA, July 9 – 11, 2007.
- [28] Y. Fu, *Zhijiang Dong, and X. He. A Translator of Software Architecture Design from SAM to Java.* Accepted by International Journal of Software Engineering and Knowledge Engineering, Vol. 17, No. 6 (December 2007).
- [29] Y. Fu, *Zhijiang Dong, X. He. A Method for Realizing Software Architecture Design.* In proceedings of the 6th International Conference on Quality Software (QSIC'06)Beijing, China, October 27–28, 2006.
- [30] Y. Fu, *Zhijiang Dong, X. He. Formalizing and Validating UML Architecture Description of Web Systems.* In proceedings of the 2nd International Workshop on Model-Driven Web Engineering (MDWE 06), in conjunction with ICWE'2006, California, 2006.
- [31] *Zhijiang Dong, Y. Fu, and X. He. A Framework for Component-based System Modeling.* In proceedings of the 18th International Conference on Software Engineering and Knowledge Engineering. San Francisco Bay, USA, July 5 – 7, 2006.
- [32] Y. Fu, *Zhijiang Dong, Xudong He. Modeling, Validating and Automating Composition of Web Services.* In proceedings of the 2006 IEEE International Conference on Web Engineering (ICWE 2006), California, 2006.
- [33] Y. Fu, *Zhijiang Dong, Xudong He. An Approach to Web Services Oriented Modeling and Validation.* In proceedings of the 2006 International Workshop on Service Oriented Software Engineering, in conjunction with International Conference on Software Engineering (ICSE'06). Shanghai, China, May 27–28, 2006.
- [34] Y. Fu, *Zhijiang Dong, and X. He. An Approach to Validation of Software Architecture Model.* In proceedings of the 12th Asia-Pacific Software Engineering Conference, Taipei, Taiwan. December 15 – 17, 2005.
- [35] *Zhijiang Dong, Y. Fu, and X. He. UML Consistency Checking Through Transformation based Petri Net Framework.* The workshop of Consistency in Model Driven Engineering (CoMoDE), in conjunction with European Conference on Model Driven Architecture, Nuremberg, Germany. November 7 – 10th,2005.
- [36] *Zhijiang Dong, Y. Fu, and X. He. An Integrated Runtime Monitoring Framework for Software Architecture Model Verification.* In proceedings of the 9th IASTED International Conference on Software Engineering and Applications, pages 106 – 112. Phoenix AZ, USA. November 14 – 16, 2005.
- [37] *Zhijiang Dong, Y. Fu, and X. He. Automated Runtime Validation of Software Architecture Design.* Lecture Notes in Computer Science, vol. 3816, pages 446 – 457. 2nd International Conference on Distributed Computing & Internet Technology. Bhubaneswar, India. December 22 – 24, 2005.
- [38] Y. Fu, *Zhijiang Dong, and X. He. A Methodology of Automated Realization of a Software Architecture Design.* In proceedings of the 17th International Conference on Software Engineering and Knowledge Engineering, pages 412 – 417. Taipei, Taiwan. July 14 – 16, 2005.
- [39] *Zhijiang Dong, Y. Fu, and X. He. Deriving Hierarchical Predicate/Transition Nets from Statechart Diagrams.* In proceedings of the 15th International Conference on Software Engineering and Knowledge Engineering, pages 150 – 157. San Francisco CA, U.S.A. July 1 – 3, 2003.

- Technical Reports**
- [40] *Zhijiang Dong and X. He. Integrating UML State-chart and Collaboration Diagrams Using Hierarchical Predicate Transition Nets.* Lecture Notes in Informatics, vol. P-7, pages 99 – 112. 2001.
- Presentations**
- [1] *Zhijiang Dong and X. He. Formalizing Software Architecture Descriptions in UML.* Technical Report at Center for Advanced Distributed Systems Engineering, School of Computing & Information Sciences, FIU. 2004.
  - [2] *Zhijiang Dong and X. He. A Framework for UML Consistency.* Technical Report at Center for Advanced Distributed Systems Engineering, School of Computing & Information Sciences, FIU. 2003.
  - [3] *Zhijiang Dong, Y. Fu, and X. He. A Methodology to Derive HPrTNs from UML State Machines.* Technical Report at Center for Advanced Distributed Systems Engineering, School of Computing & Information Sciences, FIU. 2003.
- [1] *A Runtime Checker with Evolutionary Algorithm Decision Making.* Boston, MA, Nov. 13, 2015.
  - [2] *A Runtime Checker with Evolutionary Algorithm Decision Making.* Air Force Research Lab. Rome, NY, Apr. 30, 2015.
  - [3] *Build Peer Support Network for CS2 Students.* 49th ACM Southeast Conference. Kennesaw, GA. March 24-26, 2011.
  - [4] *Experiences of Organizing Computer Science Summer Camps for High School Students.* 2010 ACM Mid-southeast Annual Conference, Gatlinburg, TN. Nov. 11-12, 2010.
  - [5] *Engage Students with the World through Real-world Project Development.* 13th CUR National Conference: Undergraduate Research as Transformative Practice: Developing Leaders and Solutions for a Better Society. Ogden, UT. June 19-22, 2010.
  - [6] *PeerSpace: A Social Networking Environment That Promotes Peer Learning Amongst College Students.* The 14th Annual Instructional Technology Conference. Murfreesboro, TN. March 29-31, 2009.
  - [7] *A Framework for Transforming, Analyzing, and Realizing Software Designs in Unified Modeling Language.* Middle Tennessee State University, April 2006.
  - [8] *A Framework for Transforming, Analyzing, and Realizing Software Designs in Unified Modeling Language.* University of Wisconsin-Platteville, April 2006.
  - [9] *Algebra or Co-algebra: The Formalization of UML Class Diagrams.* Center for Advanced Distributed System Engineering, School of Computing and Information Sciences, FIU. 2004.
  - [10] *Deriving Hierarchical Predicate/Transition Nets from Statechart Diagrams.* The 15th International Conference on Software Engineering and Knowledge Engineering. San Francisco CA, 2003.
  - [11] *Detect UML Behavioral Inconsistencies Based on HPrTNs.* Center for Advanced Distributed System Engineering, School of Computing and Information Sciences, FIU. 2003.
  - [12] *Semantics of UML Diagrams in HPrTN.* Center for Advanced Distributed System Engineering, School of Computing and Information Sciences, FIU. 2002.

## **Supervising Students**

- Dissertation committee (chair) of Graduate Thesis (Fall 2017):  
Student Name: Taylor Harvin  
Thesis Title: Runtime Verification of Statecharts on Robots
- Dissertation committee (chair) of Graduate Thesis (Spring, 2014):  
Student Name: Jason York  
Thesis Title: SQL Injection Vulnerability Detection in Web Applications
- Mentoring undergraduate student Davis Derek on a real-world project provided by Business Resource Solutions Inc. during Spring semester, 2011.
- Dissertation committee (reader) of Graduate Thesis (Spring, 2011):  
Student Name: Steven Gaddis  
Thesis Title: A Comparative Analysis of BROOK+, CUDA, and OPENCL
- Dissertation committee (reader) of Graduate Thesis (Summer, 2010):  
Student Name: Divya Jagadeesh  
Thesis Title: Preparation Station: A Practice Tool for Entry Level Computer Science Students in an Online Social Network Based Collaborative Learning Environment
- Dissertation committee (reader) of Graduate Thesis (Spring, 2010):  
Student Name: David Fiala  
Thesis Title: Building a Bi-Directional IP Tunnel over DNS
- Dissertation committee (reader) of Graduate Thesis (Spring, 2010):  
Student Name: Jiatang Dong  
Thesis Title: A Comparative Study of Fundamental Frequency Detection, Feature Extraction and Classification Techniques for Tone Recognition in Isolated Mandarin Chinese Syllable
- Mentoring undergraduate student Jean Luc Rioux on the research project: *Validate Source Code Automatically Through Aspect-oriented Programming* since Spring 2009, with the support from STEPmt Undergraduate Research program. Jean Luc Rioux presented his work in ACM Mid-Southeast Annual Conference in Gatlinburg, TN. November 12–13 2009.
- Dissertation committee (reader) of Graduate Thesis (Spring 2009):  
Student Name: Michael S. Gean  
Thesis Title: Fuzzy Sequence Matching Algorithms for the Data Cleaning Problem
- Mentoring undergraduate student Bridge Williams on the NSF CCLI project: Intellectual Algorithm Development Tutor in Spring 2008.
- Dissertation committee (reader) of Graduate Thesis (Fall 2006):  
Student Name: Abisoye Lateef Mudasiru  
Thesis Title: Command Processor: A TXL Implementation for Human-robot Interaction

## **Awards & Honors**

Recognized multiple times by graduating seniors as being a person at MTSU that had a significant influence in their life.  
Dissertation Year Fellowship (2006, FIU)  
Presidential Fellowship (2002 – 2005, FIU)  
Graduate Assistantship (2000 – 2001, FIU)  
GuangHua Scholarship (1994, HUST)  
2nd place in Mathematical Contest in Modeling (1992, Wuhan, P.R.China)  
Honor Student of University (1990 – 1994, HUST)

**Professional Activities**

Program Committee of SEKE 2019, 2018, 2017, SIGCSE 2019, 2018, 2017, SARP 2007, SERP 2007, and UMSS 2007.

Reviewer for 2009 NSF Course, Curriculum, and Laboratory Improvement (CCLI ) grant proposals, Arlington, VA, July 13 -14, 2009.

Reviewer for

IEEE International Symposium on High Assurance Systems Engineering  
SIGCSE

IEEE International Conference On Networking, Sensing and Control

IEEE Transactions on Systems, Man and Cybernetics

IEEE Transactions on Software Engineering

The Computer Journal

International Conference on Applications and Theory of Petri Nets

International Conference on Software Engineering and Knowledge Engineering

International Conference on Quality Software

International Conference on Information Reuse and Integration

IEEE Multimedia Software Engineering Conference

Paper/Presentation Judge at 2006 ACM MidSoutheast Conference

**Affiliations**

Member of ACM and ACM-SIGCSE

Member of IEEE and IEEE computer society

Member of Upsilon Pi Epsilon since 2006



Fall 2016

BIA-2610 – Statistical Methods I

3 Credit Hours

### ***Instructor Information***

**Name:** Dr. Charles H. Apigian  
**Phone Number:** (615) 898-2375  
**Office:** N333C (inside of CIS office)  
**Email:** [charles.apigian@mtsu.edu](mailto:charles.apigian@mtsu.edu)  
**Online videos:** [www.lynda.com](http://www.lynda.com)

### ***Special Note about Pre-Business Core:***

This course is one of the Pre-Business Core Classes for Admission to the Jones College of Business. You must attain a GPA of 2.25 in BIA2610, ACCT 2110, ECON 2410, and ECON 2420, as well as a 2.25 overall GPA to gain admission to the college.

### **Course Information**

#### ***Course Description:***

Business revolves around the processing of information. Accounting, finance, operations, and marketing generate data, and management information systems manage it. However, the most important aspect of processing information is its interpretation. Statistical analysis has become an important point in today's businesses as they provide the ground rules for analyzing data. The well-educated manager realizes that data does not occur in a vacuum, nor can it be expected to replicate itself even in identical conditions. The natural variability of data must be taken into account when conclusions are drawn. This is the foundation of statistical analysis.

This course will help to develop the basic skills and foundation for utilizing data to make business decisions. It will also prepare the student for higher-level analysis by teaching a methodology for processing data in a clear and concise manner.

## ***Course Objectives:***

The general objective of this course is to understand how to COLLECT, ORGANIZE, SUMMARIZE, ANALYZE, and REPORT data. You will learn SKILLS as well as KNOWLEDGE. More specifically:

- Utilize data to make business decisions
- Use software to conduct data analysis
- Understand how to decipher, breakdown, and utilize formulas and their terminology
- Use statistics to create professional reports using tables and figures

## ***Prerequisites:***

This class requires a sufficient level of mathematical maturity to work with statistics and quantitative reasoning. Please check with your department for any perquisite class, such as MATH1630.

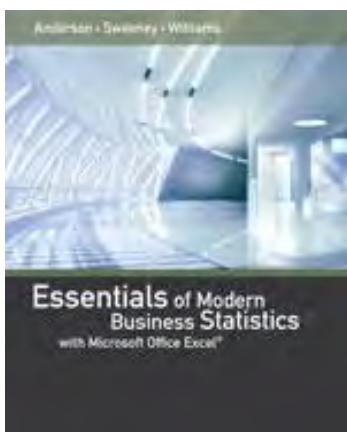
## ***Specific Course Requirements:***

This course requires a basic knowledge of Microsoft Excel, although it will be taught throughout the course. This prerequisite is necessary as the modeling and evaluation of data will be taught within that software package. Excel is the industry standard tool for spreadsheet and basic data analysis. This course will provide training in the uses of Excel in the data organization, analysis, interpretation, and presentation of data.

*All videos use Microsoft Excel for Windows, with many of the videos using the data analysis toolpak. The data analysis toolpak is not available for Excel for Mac.*

## **Textbooks and Supplementary Materials**

### **Essentials of Modern Business Statistics with Microsoft® Excel®, 6th Edition**



David R. Anderson, Dennis J. Sweeney, Thomas A. Williams  
ISBN-10: 1285867041  
ISBN-13: 9781285867045  
© 2016

**eBook is integrated through MindTap.**

NOTE: This book is used for QM2610/BIA2610 only. Starting the Fall, there is no book for BIA3620/3621.

## **Assessment and Grading**

### ***Grading Procedure:***

Grading will be a combination of automatic grading through Cengage MindTap and manual grading for exams. Below is the breakdown of points for the course.

### ***Grading Scale:***

A total of 1000 points will be available to be earned on exams, assignments, and participation in the learning community. Based on the points available, the following will be used in letter grade determination:

Points	Grade
900-1000	A
870 up to 900	B+
800 up to 870	B
770 up to 800	C+
700 up to 770	C
670 up to 700	D+
600 up to 670	D
Less than 600	F

Description	Number of Assignments	Points Each	Total Points
HW Assignments through MindTap	Varies	Varies – see site and HW Doc	500
Exams	2	250	500
Total			1000

All grade disputes must be brought to the attention of the professor within one week of receiving the grade. No changes to grades will be made after one week. All grade disputes must be submitted via e-mail. In order for your request to be considered, you must make an effort to sufficiently document the issue. Please note that there are no opportunities to gain additional points through extra credit work, etc. It is your responsibility to maintain your grade throughout the semester.

### **Assignments:**

All homework assignments will be auto-graded in the MindTap environment, explanation for your answers will be available after an attempt.

These assignments are meant for you to do well and there are several resources available to you, including videos and valuable feedback.

- You are given 2 opportunities
- The best score will be taken

### **Exams:**

*Two exams will be taken for this course. These will be taken in person with the times and location posted on the course homepage.*

*Each exam is worth 250 points and the following rules must be adhered to:*

- *You must be present to take the test.*
- *You may bring your own calculator.*
- *You may bring a one 8" X 11" sheet of paper that you may write anything on the front and the back as an aid for the test. **No books allowed.***
- *Bring a pencil and your MTSU ID for verification.*

*Exam 1 will cover Chapters 1 – 6.*

*Exam 2 will cover Chapters 7, 8, 9, 10, and 12. (Please understand it is important to know chapter 1-6 in order to complete this exam.)*

**Makeup Exams:** If you cannot make a scheduled exam time, you must schedule a make-up date with the instructor at least 1 week in advance. It also must be taken prior to the scheduled time for the entire class and you must have a valid excuse. ALL students must take the exams on campus at MTSU. Contact the instructor to receive permission and to setup a make up exam.

**See Desire2Learn for midterm and final exam dates and times.**

## **Communication Guidelines**

- **Technical Support**

Students who experience problems logging into their course, timing out of their course, using the course web site tools or experience other technical problems, should be encouraged to contact the [MTSU Help Desk](#) online (24/7) or at 1-615/898-5345.

- **Students With Disabilities**

Reasonable Accommodations for Students with Disabilities: "ADA accommodation requests (temporary or permanent) are determined only by the [Office of Disabled Student Services \(DSS\)](#). Students are responsible for contacting the Disabled Student Services Office at 615-898-2783 to obtain ADA accommodations and for providing the instructor with the Accommodation Letter from Disabled Student Services".

- **Academic Misconduct**

The use of a third party to submit a student's work is only allowed when accommodations are approved by the Disabled Student Services Office. Students found to be in violation of this policy will be reported to the faculty member and Dean of Student Affairs.

Students should be familiar with the "[MTSU Students Rights and Responsibilities](#)" handbook which **outlines academic misconduct including plagiarism, cheating, fabricating or facilitating any such act**. The Handbook also **provides a statement of community standards of civil behavior and code of computer use**.

- **Hope (Lottery) Scholarship Information**

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, or I in this class may negatively impact TELS eligibility. Dropping a class after 14 days may also impact eligibility; if you withdraw from this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until a bachelor degree is earned; students who first received the lottery scholarship in Fall 2009 or later will additionally be limited to 120 TELS attempted hours. For additional Lottery rules, please refer to your Lottery Statement of Understanding form via RaiderNet, review lottery requirements on the web at [http://w1.mtsu.edu/scholarships/telsiniteligibility\\_scholarships.php](http://w1.mtsu.edu/scholarships/telsiniteligibility_scholarships.php), or contact the Financial Aid Office at 898-2830.



## JONES COLLEGE OF BUSINESS Course Syllabus

---

### BIA 3620 – Introduction to Business Analytics Lecture

<b>Professor:</b>	Dr. Scott J. Seipel		
<b>Class:</b>	Section 003	T 2:40 – 4:05pm	BAS S126
	Section 004	M 4:10 – 5:35pm	BAS S126
<b>Office and Hours:</b>	BAS N358	M 2:00-3:45pm	T 4:15-5:30pm W 3:30-5:30pm
<b>Phone:</b>	616.898.2707 office 615.898.2362 (Information Systems and Analytics Dept.)		
<b>Email:</b>	<a href="mailto:Scott.Seipel@mtsu.edu">Scott.Seipel@mtsu.edu</a>		
<b>Textbooks:</b>	None required. Class will be supported with readings and videos that are directly linked via the course D2L website.		
<b>Other Materials:</b>	The Turning Technologies QT2 or QT Device and license is required in the course for both participation and exams. It is available at the MTSU bookstore and online.		

---

#### Mission of the Jones College of Business:

The mission of the Jones College of Business is to:

- Set our students' foundation for life-long learning through high quality learning experiences resulting from quality teaching, classroom interactions, student professional organizations, service learning, and interactions with faculty outside the classroom.
- Further the scope and dissemination of the body of business knowledge through scholarly research that advances our disciplines, enhances teaching/learning, and improves outcomes of for-profit, not-for-profit, and governmental organizations.
- Contribute to the economic development of the region through our outreach programs.

We will produce career-ready undergraduate students, MBA, MAcc, MS, and PhD graduates prepared for career challenges and advancements, significant applied research, and consulting consistent with the expertise of our disciplines.

#### Lottery Scholarship

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility. If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your MT One Stop Enrollment Coordinator (<http://www.mtsu.edu/one-stop/counselor.php>).

## **Course Description and Objectives**

The course focuses on the understanding and application of data analytics and business intelligence in industry, and has been divided into two concurrent components: a lecture (BIA 3620) and a lab (BIA 3621). This part of the course, BIA 3620, will focus on the use of data analytics and business intelligence in industry and how it can be employed to provide a company with operational and strategic advantages. The lecture will also cover the underlying tenets of data management, visualization, and the use of dashboards for data insight.

The objectives of this course are:

- You will learn how business intelligence and data analytics are used to provide a strategic advantage to companies with access to large amounts of data
- You will learn how data is acquired, stored, managed, governed, and retrieved for analysis
- You will understand how data can be transformed into useful and actionable information
- You will understand how performance is measured and how key performance indicators are formed from business measures
- You will consider, evaluate, and apply the underlying tenets behind data visualization
- You will be introduced to the use of dashboards and other reporting tools for insight into data

The experiences in this course have been designed to enhance your understanding of the role of data in the current business environment and how it can be effectively used to support decision making.

## **Preparatory Material**

This class requires a sufficient level of mathematical maturity to work with quantitative reasoning. This is satisfied by an understanding of the material presented in the prerequisites stipulated by the University requirements of BIA 2610 or equivalent course.

## **Class Format and Grading**

The course has been designed to include you in the learning process, with the opportunity to discover knowledge through active involvement. A total of 1000 points are available in the joint BIA 3620 and BIA 3621 courses. Of those points, 570 are allotted to BIA 3621 and 430 are allotted to BIA 3620 (as follows).

Clicker Participation (9 @ 10 points each – lowest is dropped)	90 points
D2L Quizzes (10 @ 10 points each)	100 points
Exams (2 @ 120 points each)	240 points
Total	430 points

Letter grades will be awarded based on the aggregate scores from both the lab and lecture sections of BIA 3620/3621 using the following scale: A: 900-1000 points, B: 800-899 points, C: 700-799 points, D: 600-699 points, F: below 600 points. Plus/minus grades will be awarded based on your relative position within a letter grade.

All grade disputes must be brought to my attention within one week of receiving the grade. No changes to grades will be made after one week.

## **Turning Technology's QT Device**

This course makes use of Turning Technology's QT2 or QT Device as both a clicker to be utilized in class for participation points, and as a mechanism for taking exams. You must have purchased, licensed, registered, and have available a QT2 or QT Device during class to obtain the points available in this course. Failure to bring your device to a class will result in a zero for participation in that class. Failure to bring your device to an exam will necessitate that you take the exam on paper and will result in a 10% deduction on your exam score and may reduce partial credit. The professor does not have additional clickers available for you to use if you fail to bring your clicker to class. Additionally, representing someone else by utilizing their clicker (whether or not they are in attendance) is considered academic dishonesty and will be reported to the Office of Academic Affairs.

## **D2L Site**

This course makes use of the D2L web system that is available on the university main website by using the direct URL: <https://elearn.mtsu.edu/>. The D2L site will be used extensively throughout the course for communication, document delivery, quizzes, and links to require readings and videos. Announcements may be posted at times to D2L regarding course changes and information. All grades earned in the class will be posted on

the D2L site as soon as possible following their submission. You can check your current grade in the class anytime by accessing the grade book on the D2L site.

To access the D2L site, you will need a username and a password. Your username is the username you were assigned when you activated your Student Computing Account. If you do not know your password or if you receive an "account disabled" notice, contact the ITD Help Desk at (615) 898-5345.

## Attendance and Participation

A significant portion of your grade is associated with participation during the lectures. Failure to attend a lecture will result in a zero for participation for that class. There are 10 lecture classes during the semester; the highest 9 scores will be used in calculating your final grade. Hence you can miss a single class without penalty if that class score is dropped. Participation requires that you actively use your clicker to address and answer questions during the lecture. Some questions require that you get the correct answer in order to obtain full credit for that part; other questions merely require that you submit an answer. Attendance will be taken via your participation with your clicker during class time.

Changes to the schedule or other course material may become necessary from time to time. You are responsible for being aware of those changes by attending class during those announcements or checking the D2L website.

## Quizzes

Homework in most weeks (see schedule) requires that you take a short 5 question quiz over the video/reading material. Quizzes are open video/reading material, but you are required to take it individually. Collusion can be tracked via IP address using D2L. You will be given 60 minutes to take each quiz and it must be completed prior to class (see due dates and times on D2L). Lowest quiz grades are not dropped, and no make-up opportunities will be made available without a significant and extensive excuse. It is not the responsibility of the professor to make adjustments if you put the quiz off and then have an emergency that prevents you from completing it. Please do not ask for an early release of all quizzes. The timing is intended to make sure that the material is still fresh in your mind in the subsequent lecture.

It may be possible to use the 60 minutes during the quiz to review the material. In the case of readings, this may not be entirely possible. It is at your discretion on whether or not you review the material prior to the quiz, but do not ask for extended time. Additionally, no extra time for network down time will be given unless D2L is documented by MTSU's ITD department as going down while you were in the quiz. Only D2L down time during the last four hours prior to the quiz deadline will result in an extension of the quiz due date/time.

## PowerPoint Slides

A student version of the class PowerPoint slides will be made available on the course website prior to class. These slides are provided to facilitate note-taking in class and for preparation for exams.

## Exams

Two exams will be given during the semester. Each exam will be based on the video and reading material, the student version of the PowerPoint slides, and class discussions. It may be necessary to take notes on the video and reading material in order to be prepared for exams. It is important to note that exams do not exclusively require the regurgitation of facts. Some exam questions will require you to demonstrate understanding of the material and apply knowledge you acquired during class.

Exam absences will have to be justified, documented, and verified before a make-up exam will be provided. Last minute or lack of advance notification of absence will require an emergency situation for justification. Excused absences will require that you take the exam early. **All exams will be closed book and closed notes; no electronic material of any kind is allowed. You must use your QT2 or QT Device to take an exam. If you fail to bring your device to an exam, you will need to notify the professor before class and sit at the front of the classroom when taking a paper exam.**

## Special Needs

If you have a disability that may require assistance or accommodation, or if you have questions about any accommodation for testing, note takers, readers, etc. please speak to me as soon as possible. Students may also contact the Office of Disabled Student Services (898-2783) with questions about such services. No accommodations will be made for any need not documented and approved by Office of Disabled Student Services.

Additionally, it is your responsibility to arrange accommodations with me prior to exams so that our schedules can be coordinated.

### **Academic Conduct:**

MTSU expects its students to maintain high standards of personal and scholarly conduct. I consider academic misconduct one of the gravest infractions at a university. Hence, breaches of the standards of conduct will be met with the severest penalties allowed, including an "F" (zero) for the course or a recommendation for dismissal from the university. Failing grades on exams earned via academic misconduct cannot be replaced by a higher grade on another exam as indicated in the Exams section above.

Academic misconduct includes the following:

- Copying from another student's exam, lab, or question set.
- Using, during an exam, materials and/or devices not authorized by the professor.
- Collaborating with or seeking aid from another student during an exam.
- Knowingly using, buying, selling, stealing, transporting, or soliciting, in its entirety or in part, the contents of an exam, quiz, or other assignment not specifically authorized by the professor for release.
- Substituting for another student, or permitting another student to substitute for oneself, to take an exam or lab.
- Representing someone other than yourself in class via a mobile device for purposes of course credit.
- Plagiarism, or the appropriation, theft, purchase, or acquisition by any means another's work, and the unacknowledged submission or incorporation of that work as one's own offered for credit.
- Facilitation, defined as intentionally or knowingly helping or attempting to help another to violate a provision of the institutional code of academic misconduct.
- Collusion or the unauthorized collaboration with another in preparing work offered for credit. Although I do not discourage you from learning and working together with other students, all material submitted for credit must be your own original work.

If you are in doubt about whether some action is allowable, you must contact me first and ask for clarification. Academic dishonesty will be reported to the Office of Academic Affairs regardless of the ramifications on your life. It is not my responsibility to minimize the damage from actions that you take.

As Stephen Covey once stated, "You can't talk your way out of what you've behaved your way into."

### **Classroom Conduct:**

While the use of electronics as learning devices has benefitted the classroom, it is critical that you learn to control their use. Thus the following policies have been put in place for this course:

- Personal use of a mobile phone is restricted during class.
  - You are required to turn the ring tone off and set the phone to vibrate.
  - You are not prohibited from glancing at an incoming call or text message. If you decide it is necessary to take a call or respond to a text, you must exit the classroom before doing so.
- Laptop and tablet computer use is not allowed in the class.
  - Research has shown that students with open laptops or tablets do worse in class even if they are looking at course material. Additionally, students have found it tempting to use their personal devices to access unrelated information and websites.

You are expected to work on class material and only class material during class. A violation of any of these policies may result in an additional assignment of the professor's choosing. Failure to submit the assignment will result in the loss of significant grade points.

### **Communication**

If you are having trouble with the material, please see me as soon as possible. Procrastination is one of the greatest impediments to accomplishment. You are welcome and strongly encouraged to visit me in my office. It is my job to provide you with the resources you need to successfully complete this class — it is your responsibility to ask for help when you need it. You are also encouraged to use e-mail for consultations that can either be easily handled or for times that you cannot make it to my office. However, please do not expect or rely on responses to e-mails sent in the evening or over the weekend and make every effort to be specific in your needs. General statements like "I don't understand what we did in class last time" are not going to be productive in emails. You are responsible for contacting me and obtaining the necessary information sufficiently early to allow you to complete your work in time.



## JONES COLLEGE OF BUSINESS Course Syllabus

---

### BIA 3621 – Introduction to Business Analytics Lab

<b>Professor:</b>	Dr. Scott J. Seipel
<b>Class:</b>	Section D06 – online
	Section D07 – online
<b>Office:</b>	BAS N358
<b>Phone:</b>	616.898.2707 office 615.898.2362 (Computer Information Systems Dept.)
<b>Email:</b>	<a href="mailto:Scott.Seipel@mtsu.edu">Scott.Seipel@mtsu.edu</a>
<b>Textbooks:</b>	None required. Class will be supported with course material that is available via the course D2L website and specific linked Lynda.com videos

---

#### Mission of the Jones College of Business:

The mission of the Jones College of Business is to:

- Set our students' foundation for life-long learning through high quality learning experiences resulting from quality teaching, classroom interactions, student professional organizations, service learning, and interactions with faculty outside the classroom.
- Further the scope and dissemination of the body of business knowledge through scholarly research that advances our disciplines, enhances teaching/learning, and improves outcomes of for-profit, not-for-profit, and governmental organizations.
- Contribute to the economic development of the region through our outreach programs.

We will produce career-ready undergraduate students, MBA, MAcc, MS, and PhD graduates prepared for career challenges and advancements, significant applied research, and consulting consistent with the expertise of our disciplines.

#### Course Description and Objectives

The course focuses on the understanding and application of data analytics and business intelligence in industry, and has been divided into two concurrent components: a lecture (BIA 3620) and a lab (BIA 3621). This part of the course, BIA 3621, will focus on the development of Microsoft Excel spreadsheet skills, and the application of Excel to data handling, visualization, modeling, and dashboard development.

The objectives of the course are two-fold: 1) to develop capability in the application of spreadsheet technology in creating and evaluating business models (prescriptive analytics); and 2) to demonstrate and develop skills in the application of spreadsheet technology to the analysis and reporting of data to support business operations and decisions. In achieving these objectives, you will:

- Learn spreadsheet basics and apply them in the development of models that can be used in business
- Evaluate these models for the effect of potential changes to the environment

- Learn how business intelligence and data analytics are used to provide a strategic advantage to companies with access to large amounts of data
- Learn how data is stored and retrieved for analysis
- Employ spreadsheet software to access, visually explore, and analyze large data sets

The spreadsheet modeling and data analytics experience in this course have been designed to enhance both your problem-solving capabilities and your marketability upon graduation.

## **Preparatory Material**

This class requires a sufficient level of mathematical maturity to work with quantitative reasoning. This is satisfied by an understanding of the material presented in the prerequisites stipulated by the University requirements of QM 2610 or equivalent course.

## **Class Format and Grading**

The course will be presented in a computer classroom using labs. It has been designed to include you in the learning process, with the opportunity to discover knowledge and skills through active involvement. A total of 1000 points are available in the joint BIA 3620 and BIA 3621 courses. Of those points, 430 are allotted to BIA 3620, and 570 are allotted to BIA 3621 (as follows).

Labs (10 @ 20 points each)	200
Exam Development Quiz Questions (10 @ 5 points each)	50
Exam 1	160
Exam 2	160
<b>Total</b>	<b>570</b>

Letter grades will be awarded based on the aggregate scores from both the lab and lecture sections of BIA 3620/3621. Plus/minus grades may be awarded based on your relative position within a letter grade.

All grade disputes must be brought to my attention within one week of receiving the grade. No changes to grades will be made after one week.

## **D2L Site**

This course makes use of the D2L web system that is available on the university main website by using the direct URL: <https://elearn.mtsu.edu/>. The D2L site will be used extensively throughout the course for communication, document delivery, and assignment submission. Announcements may be posted at times to D2L regarding course changes and information. All grades earned in the class will be posted on the D2L site as soon as possible following their submission. You can check your current grade in the class anytime by accessing the grade book on the D2L site.

To access the D2L site, you will need a username and a password. Your username is the username you were assigned when you activated your Student Computing Account. If you do not know your password or if you receive an "account disabled" notice, contact the ITD Help Desk at (615) 898-5345.

## **Attendance**

A significant portion of your grade is associated with lab assignments. If you do not attend class, you accept the responsibility for successfully completing and submitting lab work without assistance from the professor or any graduate assistant.

Changes to the schedule or other course material may become necessary from time to time. You are responsible for being aware of those changes by attending class during those announcements or checking the D2L website.

## **Lab Assignments**

Lab assignments will be due throughout the semester as indicated on the D2L website dropbox for that lab. Lab assignments will not be handed out in class – you must access the D2L site to pick up the lab requirements.

Lab assignments are **due by 11:59pm** (D2L time) on the date specified—no exceptions. Late assignments will be accepted at a penalty of 25% of the available points if submitted prior to 8:00am the next day. Assignments

submitted after the 8:00am deadline will not be accepted for credit. It is better to submit a partially complete assignment and get some credit for your work than to not submit anything at all. **Assignments should be submitted via the D2L site via the associated Dropbox.**

If the D2L site is inaccessible, you may use email. The lateness and acceptability of email submissions will be determined by the time at which they are received by the professor's email account regardless of when they are sent. The class standard is by the D2L site. Any other method of submission is at your own peril. As in industry, it is your responsibility to meet deadlines regardless of extenuating circumstances. Begin work quickly so that problems may be determined and addressed.

Lab assignments are a measure of your ability to successfully stay with the course and successfully complete course material. As step-by-step instruction is provided on the labs, feedback on submissions may only be left in cases where there is a significant point loss. If feedback is provided, it will be in the left in the D2L dropbox where the lab was submitted. Please let me know if you have trouble understanding the feedback. It is important that you learn from your mistakes so you do not lose points for the same issue more than once.

## **Lynda.com**

As a student in a course in the Jennings Jones College of Business, you have available to you a free account with the Lynda.com website (normally \$25/mo). Lynda.com provides an amazing amount of training in technology and business skills that will assist you in both this course and your career. While you are encouraged to make use of this resource for your other endeavors, this course makes specific use of training videos on Microsoft Excel.

Following each lab, specific parts of Lynda.com Excel courses have been assigned to expand and reinforce the knowledge you acquired in the lab. These videos are labeled Lynda.com video playlists on the D2L website and they are assigned as homework following each lab. The time required to work through each playlist should be no more than 90 minutes and it is possible that students who are reasonably capable in Excel may not need all of the material on Lynda.com. Regardless, it is critical that you actually work through the videos rather than just watch them. Skills are learned through active practice, not passive viewing. These videos, in conjunction with the lab assignments, should prepare you for development and success on exams.

## **Exam Development**

Exam development homework is assigned following each lab. Each exam development homework will ask you to apply the material you learned in the associated labs and Lynda.com videos to a new situation. The exam development homework will direct you through the exact material that will eventually be requested on exams. Just to re-emphasize that point, the exam development work is providing you with the exam in advance. It is up to you to prepare for the exam by applying your knowledge to a new situation. During the exam, you will simply be asked, with general instruction from an exam document, to recreate the work you developed in these exam development homework assignments.

Unlike labs, specific step-by-step instructions are not provided in the exam development homework (or on the exams). It is your responsibility to learn the material during the labs and Lynda.com training, and then apply it during exam development. *You are not required to submit any work you do on exam development; it is there solely to prepare you directly for the exam.*

Each development homework is not demanding on its own, but can require substantial time in aggregate as you are no longer given step-by-step instructions. The videos linked on Lynda.com also provide some information that may be necessary for exam development. Realize that simply working through the development will not prepare you adequately for the exam. To study for the exam, you will need to work through the material sufficiently such that you can replicate it with only general prompts or instructions.

## **Exam Development Quizzes**

To encourage students to stay current with the exam development, there is a 5-minute quiz with a single question following each exam development part. In early exam developments, this question will be simple. As you move further through the semester, the quiz may require that you alter a parameter or make a simple change to a data query to get the correct answer. All quiz questions should be easily answered within the five minutes provided, but it will be necessary for you to have a completed and correct exam development part available and usable for you to get the answers correct. Note, you will not have time to make corrections to your exam development after the quiz begins; you only have 5 minutes. The deadlines for these quizzes are posted on the D2L. Quizzes will not be available after their deadline has passed.

## **Exams**

Two exams will be given during the semester. Each exam will require that you replicate the exam development work that was assigned as homework. There will be nothing on any exam that has not been requested in the exam development work.

An absence from either exam will have to be justified, documented, and verified before a make-up exam will be provided. Last minute or lack of advance notification of absence will require an emergency situation for justification. Excused absences will require that you take the exam early. **All exams will be closed book and closed notes; no electronic material of any kind is allowed.**

## **Special Needs**

If you have a disability that may require assistance or accommodation, or if you have questions about any accommodation for testing, note takers, readers, etc. please speak to me as soon as possible. Students may also contact the Office of Disabled Student Services (898-2783) with questions about such services. No accommodations will be made for any need not documented and approved by Office of Disabled Student Services. Additionally, it is your responsibility to arrange accommodations with me prior to exams so that our schedules can be coordinated.

## **Academic Conduct:**

MTSU expects its students to maintain high standards of personal and scholarly conduct. I consider academic misconduct one of the gravest infractions at a university. Hence, breaches of the standards of conduct will be met with the severest penalties allowed, including an "F" (zero) for the course or a recommendation for dismissal from the university. Failing grades on exams earned via academic misconduct cannot be replaced by a higher grade on another exam as indicated in the Exams section above.

Academic misconduct includes the following:

- Copying from another student's exam, lab, or question set.
- Using, during an exam, materials and/or devices not authorized by the professor.
- Collaborating with or seeking aid from another student during an exam.
- Knowingly using, buying, selling, stealing, transporting, or soliciting, in its entirety or in part, the contents of an exam, quiz, or other assignment not specifically authorized by the professor for release.
- Substituting for another student, or permitting another student to substitute for oneself, to take an exam or lab.
- Representing someone other than yourself in class via a mobile device for purposes of course credit.
- Plagiarism, or the appropriation, theft, purchase, or acquisition by any means another's work, and the unacknowledged submission or incorporation of that work as one's own offered for credit.
- Facilitation, defined as intentionally or knowingly helping or attempting to help another to violate a provision of the institutional code of academic misconduct.
- Collusion or the unauthorized collaboration with another in preparing work offered for credit. Although I do not discourage you from learning and working together with other students, all material submitted for credit must be your own original work.

In general terms:

- You may sit next to someone while working on labs, talk to them, coach each other, brainstorm together, and even evaluate each other's work.
- You may not make a copy of someone's work (including the professor's), alter it, and submit it as your own.
- You may not work together on a single PC on work associated with class.
- If you email or provide your work to someone else in the class, you are participating in academic dishonesty. If the other party submits a copy or variation of your work, you will be charged with the same level of academic misconduct. The labs are not team assignments; they are individual assignments.
- If you are in doubt about whether some action is allowable, you must contact me first and ask for clarification. Academic dishonesty will be reported to the Office of Academic Affairs regardless of the ramifications on your life. It is not my responsibility to minimize the damage from actions that you take.

As Stephen Covey once stated, "You can't talk your way out of what you've behaved your way into."

## **Classroom Conduct:**

While the inclusion of electronics as learning devices has greatly benefitted the classroom, it is critical that you learn to control their use. Thus the following policies have been put in place for this course:

- Personal use of a mobile phone is restricted during class.
  - You are required to turn the ring tone off and set the phone to vibrate.
  - You are not prohibited from glancing at an incoming call or text message. If you decide it is necessary to take a call or respond to a text, you must exit the classroom before doing so.
- Laptop and tablet computer use is restricted in the class.
  - Students have found it tempting to use their personal devices to access information and websites unrelated to what we are doing. Your use of a personal tablet or laptop is limited to material that is directly related to the course. In addition, you are required to take all exams on university computers; you are not allowed to use your personal computer during an exam.

You are expected to work on class material and only class material during class. A violation of any of these policies may result in an additional assignment of my choosing. Failure to submit the assignment will result in the loss of significant grade points.

## **Communication**

If you are having trouble with the material, please see me as soon as possible. Procrastination is one of the greatest impediments to accomplishment. You are welcome and strongly encouraged to visit me in my office. It is my job to provide you with the resources you need to successfully complete this class — it is your responsibility to ask for help when you need it. You are also encouraged to use e-mail for consultations that can either be easily handled or for times that you cannot make it to my office. However, please do not expect or rely on responses to e-mails sent in the evening or over the weekend and make every effort to be specific in your needs. General statements like "I don't understand what we did in class last time" are not going to be productive in emails. You are responsible for contacting me and obtaining the necessary information sufficiently early to allow you to complete your work in time.

## **The Bottom Line**

This course will take time. The only way to ensure a good, or even a passing grade in this class, is to put forth effort inside and outside the classroom. If you do so, you will obtain a skill that will pay dividends throughout your working career



## JONES COLLEGE OF BUSINESS

### Course Syllabus

---

#### BIA 4010 – Business Analytics & Visualization

<b>Professor:</b>	Dr. Amy H. Harris
<b>Office and Hours:</b>	BAS N346
	Office Hours: M: 1:20 – 2:20; 4 – 6 PM W: 1:20 – 2:20; 4 – 5 PM
<b>Phone:</b>	615.904.8178 office 615.898.2362 (Computer Information Systems Dept.)
<b>Email:</b>	Amy.Harris@mtsu.edu
<b>Textbooks:</b>	(Optional) <i>Information Dashboard Design, 2<sup>nd</sup> ed.</i> by Stephen Few ISBN: 978-1-9383770-0-6

---

#### Mission of the Jones College of Business

The mission of the Jones College of Business is to:

- Foster student success in a large business school with a small school feeling created by caring, professional faculty and staff interacting with students as individuals, in small classes, through proactive student organizations, and in a broad range of other settings, with students' needs constantly of prime consideration;
- Provide career opportunities to our students by capitalizing on our extensive alumni network—82 percent of Jones College graduates live and work in Middle Tennessee; and
- Cultivate an international perspective among students that enables them to contribute to and succeed in the global marketplace.

We will produce graduates from our bachelor, master, doctoral, and executive and continuing education programs who are prepared for challenges and advancements in their chosen careers.

#### Hope (Lottery) Scholarship Information

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your MT One Stop Enrollment

Coordinator (<http://www.mtsu.edu/one-stop/counselor.php>).

## **Reasonable Accommodations for Students with Disabilities**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website [www.mtsu.edu/dac](http://www.mtsu.edu/dac) and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). ADA accommodation requests (temporary or permanent) are determined only by the DAC. Students are responsible for contacting the DAC to obtain ADA accommodations and for providing the instructor with the Accommodation Letter from the DAC.

## **Title IX Statements for Syllabi**

Students who believe they have been harassed, discriminated against or been the victim of sexual assault, dating violence, domestic violence or stalking should contact a Title IX/Deputy Coordinator at 615-898-2185 or 615-898-2750 for assistance or review MTSU's Title IX website for resources. <http://www.mtsu.edu/titleix/>

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX site for contact information and details. <http://www.mtsu.edu/titleix/>

## **Course Description**

Prerequisite: BIA 3620/BIA 3621 or an equivalent course. Development and application of industry-level analytic tools to visualize, model, and analyze business data. Opportunity to develop skills for self-service business analytics via hands-on approach.

## **Course Grading**

Lecture/Practice Files (15 @ 20 pts. each)	300
Exams (3 @ 150 pts.)	450
Individual Project (5 milestones at varying pt. values)	550
Total	1300 points

Letter grades will be awarded based on the following scale: A: 1170+ points, B: 1040 – 1169.99 points, C: 910 – 1039.99 points, D: 780 – 909.99 points, F: below 780 points. All grade disputes must be brought to my attention within one week of receiving the grade. No changes to grades will be made after one week.

## **Lecture/Practice Files**

Each week, you will be provided with a series of online lecture videos to review. You are expected to watch the videos and replicate the work performed in them so that you have reference files to help you prepare for exams and also conduct your project work. In addition, you will be given a practice file that builds on and reinforces the content covered in the lecture videos, but doesn't guide you through it step-by-step. You are required to submit your completed lecture and practice files for assessment by the due dates prescribed in the course schedule.

Lecture and practice file submissions will be graded on an all-or-nothing basis (you either get the full 20 points, or you don't). While your submissions do not have to be perfect, they must demonstrate that you made a best effort to complete them (i.e., your submission must contain the vast majority of the specified functionality). It is suggested that you start them early and communicate with the course teaching assistant if you run into trouble. Claiming that you "got stuck" on something is insufficient grounds for not completing a lecture or practice and will result in no points being awarded.

Unless otherwise specified in the course schedule, submissions are **due by 11:59 PM** on the date specified—no exceptions. Late assignments will not be accepted for credit. You will submit your work electronically via D2L or Dropbox for Business depending upon file size.

If the D2L site is inaccessible, you may use email. The lateness and acceptability of email submissions will be determined by the time at which they are received by the professor's email account regardless of when they are sent. If you are facing significant problems or questions at the last minute, you may be unable to contact me for resolution.

## **Exams**

Three proctored, hands-on exams will be given during the semester. An absence from any exam will have to be justified, documented, and verified before a make-up exam will be provided. Last minute or lack of advance notification of absence will require an emergency situation for justification. University excused absences such as academic and sporting events will require that you take the exam early.

## **Individual Project**

Over the course of the semester, students will engage in an individual data analysis project on a topic of their choice. The project will require students to obtain a dataset (or possibly datasets), develop questions that can be answered using their dataset(s), prepare the data for analysis, develop an interactive dashboard in Tableau that illustrates the answers to their analysis questions, and finally create a Tableau story that will serve as the basis for a final in-class project presentation.

The project is divided into a series of milestones designed to assist students in bringing it to a successful completion. For each milestone, students will submit the specified deliverables electronically via D2L or Dropbox for Business. Most milestones will also require a one-on-one meeting with Dr. Harris to discuss those deliverables and assess how students are progressing on the project.

Please refer to the D2L dropbox to verify the due date/time for each milestone. Late assignments will not be accepted for credit and missed appointments (without appropriate notice) will not be re-scheduled. Missed appointments will result in a "0" being assigned for the milestone regardless of whether electronic deliverables were submitted on time.

## **D2L**

This course makes use of the D2L content management system that is available on the university main website by clicking on the Quick Links and then selecting D2L from the list. The D2L site will be used extensively throughout the course for communication, document delivery, and assignment submission. Announcements may be posted at times to D2L regarding course changes and information. All grades earned in the class will be posted on the D2L site as soon as possible following their submission. You can check your current grade in the class anytime by accessing the grade book on the D2L site.

## **Tableau Software**

Tableau has provided a copy of their data analytics software for you to use on your own PC free of charge during the semester. We also have installations of Tableau in the classroom and in the business lab. This is an expensive piece of software that is used by companies worldwide to analyze their data and make important decisions. It is worth your time to become knowledgeable in its use; the ability to work effectively in Tableau is something that would look good on any resume. Tableau's data visualization software was provided through the Tableau for Teaching program.

## **Zoom Software**

Students who are unable to come to campus during office hours or for scheduled project meetings with Dr. Harris may request web-based meetings. Upon receiving a request for a web meeting, Dr. Harris will create a meeting using the Zoom web conferencing application and send a meeting invitation to the student making the request.

Students are not required to have a Zoom account to participate in web meetings, but anyone wishing to attend a Zoom meeting created by Dr. Harris will need to have the Zoom Client for Meetings installed on their computer. A link to the Zoom web page where you can download the appropriate installer is provided in D2L. If you try to join a meeting without having the client installed, you will be walked through the installation process before you are allowed to join the meeting. Should you choose to wait until right before your first scheduled meeting with Dr. Harris to install the client, please allow yourself enough time to get the software installed before the meeting is set to start.

In addition to the Zoom client, students will need the following to use Zoom:

- A PC or Mac
- A reliable internet connection
- Webcam or built-in webcam
- Headset or headphones or speakers. A headset or headphones is preferred to speakers.
- Microphone or webcam microphone or built-in microphone. A headset with a microphone is preferred to a webcam microphone or built-in microphone.

## **Academic Conduct:**

MTSU expects its students to maintain high standards of personal and scholarly conduct. I consider academic misconduct one of the gravest infractions at a university. Hence, breaches of the standards of conduct will be met with the severest penalties allowed, including an "F" (zero) for the course or a recommendation for dismissal from the university.

Academic misconduct includes the following:

- Copying from another student's exam, quiz, or assignment.
- Using, during a quiz or exam, materials and/or devices not authorized by the professor.
- Collaborating with or seeking aid from another student during an exam or quiz.
- Knowingly using, buying, selling, stealing, transporting, or soliciting, in its entirety or in part, the contents of an exam, quiz, or other assignment not specifically authorized by the professor for release.
- Substituting for another student, or permitting another student to substitute for oneself, to take an exam or quiz.

- Plagiarism, or the appropriation, theft, purchase, or acquisition by any means another's work, and the unacknowledged submission or incorporation of that work as one's own offered for credit.
- Facilitation, defined as intentionally or knowingly helping or attempting to help another to violate a provision of the institutional code of academic misconduct.
- Collusion or the unauthorized collaboration with another in preparing work offered for credit. All material submitted for credit must be your own original work.

In general terms:

- You may sit next to someone while working on classwork, talk to them, coach each other, brainstorm together, and even evaluate each other's work.
- You may not make a copy of someone's work (including the professor's), alter it, and submit it as your own.
- You may not work together on one PC or on one file.
- If you email or provide your work to someone else in the class, you are participating in academic dishonesty. If the other party submits a copy or variation of your work, you will be charged with the same level of academic misconduct. The assignments are not team assignments; they are individual assignments.
- If you are in doubt about whether some action is allowable, you must contact me first and ask for clarification. If I have evidence of academic dishonesty, I will report it to the Office of Academic Affairs regardless of the ramifications on your life. It is not my responsibility to minimize the damage from actions that you take.

## **Communication**

It is my job to provide you with the resources you need to successfully complete this class — it is your responsibility to ask for help when you need it. Please feel free to call my office phone and leave a message; however, the most effective way to reach me outside of office hours is via my MTSU e-mail ([amy.harris@mtsu.edu](mailto:amy.harris@mtsu.edu)). I will do my best to respond as quickly as possible (my goal is within 24 hours, excluding weekends). When e-mailing, please note that it is unacceptable to send me files asking for general help (i.e. "What is wrong with my dashboard?"). Your e-mails should always address specific issues and, when applicable, include a screenshot of your issues or an attachment of your file for review. In situations that cannot be resolved via e-mail, a Zoom meeting might also be an alternative.

**Spring 2019 - Section 007 (17643)****DESCRIPTION:**

Computer programming using a high-level language. Language constructs and simple data structures, such as strings and lists, are covered. Emphasis on problem solving using the language and principles of structured software development. (4 credit hours)

**Prerequisite:** Sufficient background in algebra and trigonometry (e.g., MATH 1730)

**INSTRUCTOR:**

**Dr. Roland Untch**    **untch@mtsu.edu**    Telephone: (615) 615-898-5047

**SCHEDULE:**

<b>Office Hours: KOM 353</b>	
Monday	3:30pm-5pm
Tuesday	2pm-4pm
Wednesday	10:30am-Noon
Thursday	2pm-4pm
<i>or</i>	by appointment

<b>Section 007</b>		
Lecture: KOM 307	Monday & Wednesday	12:40pm-2:05pm
Lab KOM 360	Monday & Wednesday	2:20pm-3:20pm

**ATTENDANCE & COMMUNICATION:**

Attendance is required and absences do not excuse one from class responsibilities. (See below about attendance and your grade.) If you miss a class, be sure to get the missed material from a classmate. Please be on time to class sessions; lateness is disruptive to the class.

Students failing to attend the first two class meetings will be dropped from the course.

You must obtain the instructor's advance permission to use any recording device, computer, or other electronics during lecture. No phone or network use during lecture. Pagers, phones, and audio devices must be silenced or turned off in the classroom. No food or tobacco in the classroom.

The [course website](https://cs.mtsu.edu/~untch/1170) (<https://cs.mtsu.edu/~untch/1170>) contains notices and assignment postings. You are responsible for checking the website and monitoring for course e-mail daily (weekdays only). Following MTSU's FERPA-based [e-mail policies](#), all course-related e-mail will be sent to your [MTMAIL](#) account; in turn, you are required to use your **MTMAIL** account when communicating with the instructor. (Note: The instructor does not send or receive correspondence via D2L; please do not try to contact the instructor through D2L.)

**REASONABLE ACCOMMODATION FOR STUDENTS WITH DISABILITIES:**

If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with the instructor as soon as possible. Any student interested in reasonable accommodations can consult the *Disability & Access*

Center (DAC) website [www.mtsu.edu/dac](http://www.mtsu.edu/dac). Students may also contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973.

**GRADE BASED ON:** (*Tentative, subject to change*)

Open Lab Assignments (OLA): Exercises & Projects	20%
Closed Lab Assignments (CLA)	10%
Exams (in-term)	40%
Comprehensive Final Exam	30%

Three in-term exams will be given. Because almost everyone has at least one bad exam, the lowest in-term exam score will be dropped. (That means each in-term exam is worth 20%.) Missed exams will count as zero; no makeups will be given.

The conventional (CVL) grading scale is: A (90-100); B+ (87-89); B (83-86); B- (80-82); C+ (77-79); C (73-76); C- (70-72); D (60-69); F (below 60); (averages are rounded to the nearest integer). The "Late Bloomer Reward" (LBR) grading scale awards a grade of C to students scoring 73% or higher on the Final Exam *and* having a 50% or higher average on the in-term exams. The scale, CVL or LBR above, that yields the higher value will be used in assigning the course grade subject to the following two conditions: (1) The highest course grade attainable *if scoring less than 73% on the Final Exam is C-* and (2) the highest course grade attainable *if missing four or more open lab assignments (OLAs) or failing closed lab (CLA) is C-*.

**Attendance Bonus:** Research shows a strong positive correlation between attending class and a good grade in that class. To make that correlation even more positive, the following attendance bonus is offered. If a student does not miss any class, then their final base course total will be increased by 3%. If a student only misses one class, then 2% will be added; if a student only misses two classes, then 1% will be added. No bonus will be applied for students missing three or more classes. An attendance roster will be circulated at each class session. It is your responsibility to locate and sign this roster each class period. **Signing for another student is NOT acceptable.**

**EXAM SCHEDULE:** (*Tentative, subject to change. Check course website for revisions.*)

	Section 007
Exam 1	<b>Feb 13</b>
Exam 2	<b>Mar 20</b>
Exam 3	<b>Apr 10</b>
Final	<b>Apr 29 (12:30pm-2:30pm)</b>

All exams are closed book, closed notes.

---

**TEXTBOOK:**

[Tony Gaddis, \*Starting Out with Python\*](#) (4th Edition), 2018.

Chapter coverage: **1, 2, 3, 4, 5, 6, 8, and 7** (in that order)

(*Subject to change*)

Page 124

Academic Affairs, Student Life, and Athletics Committee

September 4, 2019

## **GOALS:**

The primary goal of this course is the development of *program design* and *program construction* skills. Topics related to program design include functional decomposition, structured programming, algorithm design, procedural abstraction, and the application of simple data structures. Topics related to program construction include the Python programming language, UNIX tools, programming language concepts, and program development techniques.

## **LEARNING OUTCOMES:**

Upon successful completion of this course, a student will be able to:

- Apply functional decomposition in the design of a program.
- Develop an algorithmic solution to solve a problem using sequence, selection, and iteration.
- Use simple data structures, such as arrays and strings, in an algorithmic solution.
- Demonstrate the use of procedural abstraction through the design and implementation of effective procedures and functions.
- Construct a readable, well documented, and syntactically correct Python program.
- Explain the syntax and semantics of a target set of Python language elements.
- Use UNIX tools to edit, compile, link, and execute a program.
- Predict the state changes of a program in execution and trace its execution.

## **CLOSED LABS:**

The closed lab portion of this course gives students the opportunity to learn and practice the skills needed to do open labs and be successful on exams. Unlike your open lab assignments, which you must work on independently, closed lab assignments (CLAs) give you the opportunity to discuss problems with classmates and seek assistance from the instructor or the lab assistant. You are expected to attend all closed labs. Additional information about the closed labs can be found in [Handout 2: Closed Lab Information](#).

## **OPEN LABS:**

Open lab assignments (OLAs) are, quite simply, *homework*. Open lab assignments are classified by the instructor as either *exercises* or *projects*.

- **EXERCISES:** Homework assignments that are classified as exercises have explicit deadlines: both **date** and **time**. NO EXERCISE WILL BE ACCEPTED LATE.
- **PROJECTS:** Homework assignments that are classified as projects are due by midnight (defined to be 11:59pm) of the day due. Late projects will be accepted subject to the following grade reduction schedule: 10% one day late, 20% two days late, and 30% three days late. Four days late and after, projects can no longer be accepted.

*Special Note: no assignments (CLA or OLA) can be turned in after the last day of classes.*

## **PAPER ASSIGNMENTS:**

To aid the orderly processing of collected paper homework assignments, the following guidelines are to be used. Unless otherwise directed, hand paper assignments to the instructor in person or put in the Academic Affairs Student Life and Athletics Committee box located in the hallway near the front entrance of the building. All assignments are due at the end of the class period. No late assignments will be accepted. The following guidelines are to be used.

instructor's mailbox in KOM 306. All non-computer assignments must be turned in on 8 1/2 by 11 inch paper. Multiple sheets must be stapled together. In the upper right-hand corner of the top sheet: put your name on one line; course id-section and instructor's name on the next; the assignment id on the third; and the due date on the fourth. For example, for students in section 007, your third open lab assignment would have:

Your Name  
CSCI 1170-007 - Dr. Untch  
OLA103  
Due: mm/dd/yy

---

## ACADEMIC INTEGRITY & INDIVIDUAL EFFORT:

You know that using another's work as your own is wrong. The Computer Science Department's [Policy on Academic Integrity](#) applies to this course. Unless otherwise directed, work alone on open lab assignments. The penalty for unauthorized collaboration will range from a grade of zero for an assignment to a failing grade for the course.

---

## TUTORING:

Free tutoring is available for this (plus many other) courses. Visit <http://mtsu.edu/studentsuccess/tutoring.php> or call the *Tutoring Spot* at 615-904-8014. Besides course specific tutoring, help to improve study skills is available.

## FINANCIAL AID NOTICE:

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship (TELS) eligibility, you must earn a cumulative TELS GPA (Grade Point Average) of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in any course may negatively impact TELS eligibility. Dropping or stopping attendance in a class after the first 14 days of the semester may also impact eligibility; if you withdraw from or stop attending a course and consequently fall to below full-time status (that is, have less than 12 credit hours), you may lose eligibility for your lottery scholarship and you will not be able to regain eligibility at a later time. For additional TELS rules and eligibility information, please refer to your [Lottery Statement of Understanding](#) form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your [MT One Stop Enrollment Counselor](#) (<http://www.mtsu.edu/one-stop/counselor.php>).

**Students receiving any form of financial aid should always consult with their *MT One Stop Enrollment Counselor* before dropping a course. *MT One Stop* is located in Room 210 of the Student Services and Admissions Center (SSAC).**

## TITLE IX:

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX site (<http://www.mtsu.edu/titleix>) for contact information and details.

---

**Spring 2019 - Section 003 (10020) & Section 004 (13384)****DESCRIPTION:**

A continuation of CSCI 1170. Topics include the C++ programming language, introductory object-oriented programming techniques, software engineering principles, records, pointers, linked lists, stacks and queues, and sorting and searching. (4 credit hours)

**Prerequisite:** CSCI 1170 (with a grade of C or better)

**INSTRUCTOR:**

**Dr. Roland Untch**    **untch@mtsu.edu**    Telephone: (615) 615-898-5047

**SCHEDULE:**

<b>Office Hours: KOM 353</b>	
Monday	3:30pm-5pm
Tuesday	2pm-4pm
Wednesday	10:30am-Noon
Thursday	2pm-4pm
<i>or</i>	by appointment

<b>Section 003</b>	
Lecture: KOM 307	Tuesday & Thursday 11:20am-12:45pm
Lab KOM 360	Tuesday & Thursday 1:00pm-2:00pm
<b>Section 004</b>	
Lecture: KOM 307	Tuesday & Thursday 4:20pm-5:45pm
Lab KOM 360	Tuesday & Thursday 6:00pm-7:00pm

**ATTENDANCE & COMMUNICATION:**

Attendance is required and absences do not excuse one from class responsibilities. (See below about attendance and your grade.) If you miss a class, be sure to get the missed material from a classmate. Please be on time to class sessions; lateness is disruptive to the class.

Students failing to attend the first two class meetings will be dropped from the course.

You must obtain the instructor's advance permission to use any recording device, computer, or other electronics during lecture. No phone or network use during lecture. Pagers, phones, and audio devices must be silenced or turned off in the classroom. No food or tobacco in the classroom.

The [course website](https://cs.mtsu.edu/~untch/2170) (<https://cs.mtsu.edu/~untch/2170>) contains notices and assignment postings. You are responsible for checking the website and monitoring for course e-mail daily (weekdays only). Following MTSU's FERPA-based [e-mail policies](#), all course-related e-mail will be sent to your [MTMAIL](#) account; in turn, you are required to use your **MTMAIL** account when communicating with the instructor. (Note: The instructor does not send or receive correspondence via D2L; please do not try to contact the instructor through D2L.)

**REASONABLE ACCOMMODATION FOR STUDENTS WITH DISABILITIES:**

If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with the instructor as soon as possible. Any student interested in reasonable accommodations can consult the *Disability & Access Center (DAC)* website [www.mtsu.edu/dac](http://www.mtsu.edu/dac). Students may also contact the *DAC* for assistance at 615-

898-2783 or **dacemail@mtsu.edu**. Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973.

**GRADE BASED ON:** (*Tentative, subject to change*)

<i>Grade Component:</i>	Grading Method→	<i>CVL</i>	<i>LBR</i>
Open Lab Assignments (OLA): Exercises & Projects		25%	25%
Closed Lab Assignments (CLA)		10%	5%
Exams		40%	30%
Comprehensive Final Exam		25%	40%

Two in-class exams will be given. No makeup exams will be given. However, in the event you have an excused absence that causes you to miss exam 1, then your exam 2 score (suitably scaled) will be used in its place. Similarly, if you miss exam 2 due to an excused absence, then your final exam score (suitably scaled) will be used. A missed final exam will count as zero.

The grading scale is: A (90-100); B+ (87-89); B (83-86); B- (80-82); C+ (77-79); C (73-76); C- (70-72); D (60-69); F (below 60); (averages are rounded to the nearest integer). The grade in the course will be calculated using the two methods shown above: the conventional (CVL) and the "Late Bloomer Reward" (LBR); the calculation that yields the higher value will be used in assigning the course grade subject to the following two conditions: **(1)** The highest course grade attainable *if scoring less than 65% on the Final Exam is C-* and **(2)** the highest course grade attainable *if missing four or more open lab assignments (OLAs) or failing closed lab (CLA) is C-*.

**Attendance Bonus:** Research shows a strong positive correlation between attending class and a good grade in that class. To make that correlation even more positive, the following attendance bonus is offered. If a student does not miss any class, then their final base course total will be increased by 3%. If a student only misses one class, then 2% will be added; if a student only misses two classes, then 1% will be added. No bonus will be applied for students missing three or more classes. An attendance roster will be circulated at each class session. It is your responsibility to locate and sign this roster each class period. **Signing for another student is NOT acceptable.**

**EXAM SCHEDULE:** (*Tentative, subject to change. Check course website for revisions.*)

	Section 003	Section 004
Exam 1	<b>Feb 28</b>	<b>Feb 28</b>
Exam 2	<b>Apr 4</b>	<b>Apr 4</b>
Final	<b>Apr 30 (10:30am-12:30pm)</b>	<b>May 2 (3:30pm-5:30pm)</b>

All exams are closed book, closed notes.

---

**TEXTBOOK:**

Tony Gaddis, [Starting Out with C++ from Control Structures to Objects](#) (9th Edition), 2018  
Page 128  
Academic Affairs, Student Life, and Athletics Committee  
September 4, 2019

## **GOALS:**

The continued development of the student's *program design* and *program construction* skills. Topics related to program design include functional decomposition, object-oriented design, algorithm design and analysis, procedural abstraction, and the application and implementation of fundamental data structures. Topics related to program construction include the C++ programming language, UNIX tools, programming language concepts, and object technology.

## **LEARNING OUTCOMES:**

Upon successful completion of this course, a student will be able to:

- Explain the concept of abstract data type (ADT).
- Apply object oriented concepts in the design of a program.
- Use fundamental data structures (list, stack, queue, tree) in an algorithmic solution.
- Construct a C++ program that uses pointers to reference and manipulate dynamically allocated memory.
- Explain the syntax and semantics of a target set of C++ language elements, including those related to constructing objects.
- Use appropriate tools to test and debug a program.
- Determine the resource requirements of simple algorithms and fundamental data structures.
- Identify the most appropriate data structures and algorithms for a range of applications.

## **CLOSED LABS:**

The closed lab portion of this course gives students the opportunity to learn and practice the skills needed to do open labs and be successful on exams. Unlike your open lab assignments, which you must work on independently, closed lab assignments (CLAs) give you the opportunity to discuss problems with classmates and seek assistance from the instructor or the lab assistant. You are expected to attend all closed labs. Additional information about the closed labs can be found in [Handout 2: Closed Lab Information](#).

## **OPEN LABS:**

Open lab assignments (OLAs) are, quite simply, *homework*. Open lab assignments are classified by the instructor as either *exercises* or *projects*.

- **EXERCISES:** Homework assignments that are classified as exercises have explicit deadlines: both **date** and **time**. NO EXERCISE WILL BE ACCEPTED LATE.
- **PROJECTS:** Homework assignments that are classified as projects are due by midnight (defined to be 11:59pm) of the day due. Late projects will be accepted subject to the following grade reduction schedule: 10% one day late, 25% two days late, and 50% three days late. Four days late and after, projects can no longer be accepted.

*Special Note: no assignments (CLA or OLA) can be turned in after the last day of classes.*

## **PAPER ASSIGNMENTS:**

To aid the orderly processing of collected paper homework assignments, the following guidelines are to

be used. Unless otherwise directed, hand paper assignments to the instructor in person or put in the instructor's mailbox in KOM 306. All non-computer assignments must be turned in on 8 1/2 by 11 inch paper. Multiple sheets must be stapled together. In the upper right-hand corner of the top sheet: put your name on one line; course id-section and instructor's name on the next; the assignment id on the third; and the due date on the fourth. For example, for students in section 001, your third open lab assignment would have:

Your Name  
CSCI 2170-001 - Dr. Untch  
OLA203  
Due: mm/dd/yy

---

## ACADEMIC INTEGRITY & INDIVIDUAL EFFORT:

You know that using another's work as your own is wrong. The Computer Science Department's [Policy on Academic Integrity](#) applies to this course. Unless otherwise directed, work alone on open lab assignments. The penalty for unauthorized collaboration will range from a grade of zero for an assignment to a failing grade for the course.

---

## TUTORING:

Free tutoring is available for this (plus many other) courses. Visit <http://mtsu.edu/studentsuccess/tutoring.php>. Besides course specific tutoring, help to improve study skills is available.

## FINANCIAL AID NOTICE:

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship (TELS) eligibility, you must earn a cumulative TELS GPA (Grade Point Average) of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in any course may negatively impact TELS eligibility. Dropping or stopping attendance in a class after the first 14 days of the semester may also impact eligibility; if you withdraw from or stop attending a course and consequently fall to below full-time status (that is, have less than 12 credit hours), you may lose eligibility for your lottery scholarship and you will not be able to regain eligibility at a later time. For additional TELS rules and eligibility information, please refer to your [Lottery Statement of Understanding](#) form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your [MT One Stop Enrollment Counselor](#) (<http://www.mtsu.edu/one-stop/counselor.php>).

**Students receiving any form of financial aid should always consult with their *MT One Stop Enrollment Counselor* before dropping a course. *MT One Stop* is located in Room 210 of the Student Services and Admissions Center (SSAC).**

## TITLE IX

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX site (<http://www.mtsu.edu/titleix>) for contact information and details.



# **Course Syllabus: CSCI 3080: Discrete Structures Spring 2019**

## **Professor Information:**

**Professor:** Dr. C. Pettey

**Contact Information:** [chrisila.pettey@mtsu.edu](mailto:chrisila.pettey@mtsu.edu) / KOM 362 / 898-5737

**Course website:** <https://www.cs.mtsu.edu/~pettey/3080/>

## **Office Hours:**

MW 3:20 – 4:20

TR 1 - 4

Others by appointment

## **General Course Information:**

**Prerequisites:** You must have earned a C or better in CSCI 1170 and MATH 1910.

**Textbook:** Mathematical Structures For Computer Science, Seventh Edition, by Gersting, W. H. Freeman and Co., 2003.

**Topics:** Selected portions of Chapters 1, 2, 3, 5, 6, 7 and 9 in the book, and the following from the course website: the Handout on Encoding Schemes, linux cheat sheet, and C++ tutorials will be covered during the semester.

**Goal:** To introduce students to the theoretical concepts, data structures and algorithms in discrete mathematics in order to establish a theoretical basis for future study in computing applications and algorithms.

**Learning Outcomes:** All outcomes are in support of MTSU CS learning outcome a: Students will demonstrate an ability to apply knowledge of computing and mathematics appropriate to the discipline.

- 1. A student will be able to demonstrate an understanding of concepts of formal logic such as statements, symbolic representation, tautologies, propositional logic, quantifiers, predicates, and validity.
- 2. A student will be able to demonstrate an understanding of proof techniques, induction, recursive definitions, and recurrence relations.
- 3. A student will be able to demonstrate an understanding of matrix operations.
- 4. A student will be able to demonstrate an understanding of graphs and trees and their representations.
- 5. A student will be able to demonstrate understanding of various graphs algorithms.
- 6. A student will be able to demonstrate an understanding of finite state machines, Turing machines, and formal languages.
- 7. A student will be able to demonstrate an understanding of various encoding schemes.

## **COURSE POLICIES:**

- USE OF ELECTRONIC DEVICES IS NOT ALLOWED in lecture or in lab. This includes, but is not limited to, phones, laptops, tablets, and smart watches. Phones must be turned off or on silent and placed inside your bag at all times. This is in compliance with the College of Basic and Applied Sciences Policy for Appropriate Use of Hand-held and Wireless Technology (see Handout #3). Additionally, students are not permitted to take photos or record any part of a class/lab/other session unless explicitly granted permission by the instructor or the MTSU Disability Access Center. Sanctions for violation of this policy will be determined by the instructor and may include dismissal from the class, attendance penalties or loss of class participation points, zero grades on

quizzes or examinations, failure in the class, or other penalties that the instructor determines to be appropriate.

- All course materials are protected by the law of copyright. Students are not authorized to use, reuse, reproduce, distribute, broadcast or publish the course materials, or any part of the course materials, in any medium, including on social media. This means that students are not allowed to photograph or reproduce course materials (for example, class PowerPoint slides), and that students are not allowed to record lectures, except as provided for by an approved ADA request. It also means that students are not allowed to distribute any course materials via any means, including via the internet and social media sites, including those such as GroupMe which primarily are accessed by cell phone.
- All hand written assignments/tests MUST be done in black pencil or they will receive a grade of 0.
- Attendance is required and absences do not excuse one from class responsibilities. If you miss a class, be sure to get the missed material from a classmate. Please be on time to class sessions; lateness is disruptive to the class.
- Attendance is taken every class meeting. Lack of attendance can affect your grade as graded assignments may be given during class time.
- Students failing to attend the first two class meetings will be dropped from the course.
- The course website (<https://cs.mtsu.edu/~pettey/3080>) contains notices and assignment postings. You are responsible for checking the website and monitoring for course e-mail daily (weekdays only). Following MTSU's FERPA-based e-mail policies, (<https://cs.mtsu.edu/~untch/share/FerpaEmailPolicy.html>) all course-related e-mail will be sent to your MTMAIL account; in turn, you are required to use your **MTMAIL** account when communicating with the instructor. (Note: The instructor does not send or receive correspondence via D2L; please do not try to contact the instructor through D2L.)
- Academic Integrity/Misconduct: Please review the information on Academic Integrity and Misconduct (<http://www.mtsu.edu/provost/acadmisconduct.php>). Academic integrity is a hallmark of Middle Tennessee State University. We expect students to complete academic exercises, i.e., assignments turned in for credit, that are original and appropriately credit all sources used.

Academic misconduct includes, but is not limited to:

1. Plagiarism: The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper attribution. This includes self-plagiarism, which occurs when an author submits material or research from a previous academic exercise to satisfy the requirements of another exercise and uses it without proper citation of its reuse.
2. Cheating: Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. This includes unapproved collaboration, which occurs when a student works with others on an academic exercise without the express permission of the professor. It also includes purchasing assignments or paying another person to complete a course for you.
3. Fabrication: Unauthorized falsification or invention of any information or citation in an academic exercise.

Going online and using information without proper citation, copying parts of other students' work, creating information to establish credibility, or using someone else's thoughts or ideas without appropriate acknowledgment is academic misconduct. If you have a question about an assignment, please ask me to clarify. All cases of academic

misconduct will be reported to the Director of Student Academic Ethics and may result in failure on the test/assignment or for the course.

When students participate in behavior that is considered to be academic misconduct, the value of their education and that of their classmates is lessened, and their academic careers are jeopardized.

Students guilty of academic misconduct are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions (including expulsion from the university), which may be imposed through the regular institutional procedures as a result of academic misconduct, the instructor has the authority to assign an “F” or zero for an activity or to assign an “F” for the course. Students guilty of plagiarism will be immediately reported to the Director of Student Academic Ethics.

If using Turnitin.com to review work for originality, include information on how the tool is to be used, if the papers will be submitted to the Turnitin database and if students will have the opportunity to review the report generated.

- The Computer Science Department's Policy on Academic Integrity (<https://cs.mtsu.edu/~csdept/Academics/academicIntegrity.htm> Handout #4) applies to this course. Unless otherwise directed, work alone on open lab assignments. The penalty for unauthorized collaboration will range from a grade of zero for an assignment to a failing grade for the course.
- **Extra credit policy:** In general, extra credit is not an option in this class. In the highly unlikely event that an exception is made to this rule, the entire class will be given the option of doing the extra credit.

## COURSE GRADING:

**Tests:** There will be 4 in class 100-point exams given throughout the semester. These will cover lectures, assigned readings, homework assignments, etc. If, for some unavoidable reason you must miss a test, see me about the possibilities of a makeup. Unexcused absences will NOT be allowed to makeup tests. The test dates are: January 30, 2019, March 1, 2019, April 1, 2019 (not a joke), and April 24, 2019. Due to the size of the class, graded tests will generally not be handed back before two weeks after the test date.

**Final Exam:** There will be no final exam for this course.

**Quizzes:** There will be a quiz over each topic covered (approximately one per class meeting date). Quizzes will be 10 points each. Quizzes will be given during class after the homework is discussed.

**Homework assignments:** The topics for each day can be found on the class calendar. Homework assignments for each topic are worth 2 points each and are due at the beginning of class on the date the topic will be discussed in class. Homework assignments are listed on the class website. It is expected that you will read the section, watch the video for each topic, and do the homework assignment for each topic prior to coming to class the day the topic is to be discussed.

**Laboratory assignments:** There will be 6 - 8 laboratory assignments. Laboratory assignments will be worth 25 points each.

### **IMPORTANT RULES FOR LAB ASSIGNMENTS:**

1. You may NOT use classes, structs, pointers (other than things like array names), or the standard template library unless I specifically give permission for that one lab in the writeup of the lab assignment.
  2. Programs must be written in C++ (see C++ tutorials on the course website if you do not know C++)
  3. Lab assignments are due at 11:59pm on the due date and will NOT be accepted late unless it is an excused absence.
  4. All laboratory assignments must be well documented (see documentation requirements on the class website under labs).
  5. If a program assignment does not compile and execute, then it will receive a grade of 0.
  6. Lab assignments will be submitted by using the turnin program (see class website under course policies for a description of how to use turnin).  
**Submissions via email will not be accepted.**
  7. All programs will be turned in to and graded on the Linux boxes.
  8. You must use a personal Linux account (see LinuxAccounts under Open Lab Problems on the class website for information on how to get a Linux account). If you already have a Linux account, you may need to click the renew account link under your personal account repairs.
- 9. Submissions using another class' "e" account will not be accepted.**

**Letter grades** The grade is determined by adding points earned, dividing by the possible number of points, multiplying by 100, and applying the following scale: A (90-100); B (80-89); C (70-79); D (60-69); F (below 60); (averages are rounded to the nearest integer). *Plus and minus grades may be given at the professor's discretion, but only if it constitutes a higher grade than that listed on the above scale.*

## **STUDENT RESOURCES**

Frequently Used Student Resources can be found at <http://www.mtsu.edu/university-college/forms.php#StudentSupport>

### **Technical Support**

Students who experience problems with D2L or wireless connectivity issues, should be encouraged to contact the MTSU Help Desk online (24/7) or at 1-615-898-5345.

Students who experience problems with the Department of Computer Science servers/lab machines/software should let their lab assistant know.

### **Students with Disabilities**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). Also, if you require the use of assistive technology, please make sure to

download the documents in order to access the accessibility that I have built into the content for you.

### **Hope (Lottery) Scholarship Information**

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you may not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form or contact your MT One Stop Enrollment Counselor.

### **Grade Appeals**

University Policy 313, Student Grade Appeals, provides an avenue for MTSU students to appeal a final course grade in cases in which the student alleges that unethical or unprofessional actions by the instructor and/or grading inequities improperly impacted the final grade.

### **Title IX**

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX site (<http://www.mtsu.edu/titleix>) for c

**Free Tutoring:** Take advantage of our FREE tutoring service and learn how to study, get help with understanding difficult course material, receive better test grades, or simply improve your grade point average. Tutoring is available in *study skills* and *learning strategies* that includes sessions on time management, note taking, when and where to study, and memory principles. Tutoring is also available in over 200 courses including biology, history, computer information systems, physics, math, psychology, chemistry, economics, recording industry, and many more. The central location for tutoring is the Tutoring Spot, located in Walker Library, but is also conducted at various other campus sites. For available tutoring opportunities, visit <http://mtsu.edu/studentsuccess/tutoring.php#on>. For questions, call the Tutoring Spot at 615-904-8014.

# CSCI 3110 - Algorithms And Data Structures (Fall 2019)

[Course Home](#) | [Course Syllabus](#) | [Calendar](#)

## SYLLABUS

### Course description

Topics include additional object-oriented programming techniques, algorithm design, analysis of algorithms, advanced tree structures, indexing techniques, internal and external sorting, graphs, and file organizations. (3 credit hours)

### Prerequisites

CSCI 2170 (Computer Science II) with a grade of C or better.

### Co-requisites

Either simultaneous enrollment, or a grade of "C" or better, in CSCI 3080 (Discrete Structures) is necessary to take this course.

### Instructor

**Dr. Sal Barbosa** [sal \[dot\] barbosa \[at\] mtsu.edu](mailto:sal [dot] barbosa [at] mtsu.edu) Kirksey Old Main (KOM) 357 Telephone: (615) 898-2416

### Textbook

[Data Structures and Algorithms in C++, 4th Edition](#) by Adam Drozdek.

### Schedule

Please ensure you are reading the meeting times for your course section.

Office Hours: KOM 357		Meeting Times	
Monday	10:30-11:30am	Section 001 KOM 452	Monday and Wednesday 12:40-2:05pm
Tuesday	3:30-4:30pm		
Wednesday	9:30-10:30am		
Thursday	10:30-11:30am,2:00-3:00pm		
Friday	9:15-10:15am		
or	by appointment		

### Important Dates

Last day to drop without a grade	<b>Jan 27, 2019</b>
Last day to drop with a "W"	<b>Mar 24, 2019</b>
Last day of classes	<b>Apr 24, 2019</b>
Exam 3 (during final exam session)	<b>Apr 29, 2019</b>

### Learning Outcomes

Upon successful completion of this course, a student will be able to:

- Write object-oriented programs using advanced techniques such as inheritance, polymorphism, dynamic binding, and generic programming.
- Design and implement various sorting algorithms such as selection, bubble, insertion, merge, quick, and heap sorts
- Design and implement more complicated structures such as priority queue, heap, balanced search trees, hashing tables, and graphs as classes (including search, insert, delete, and traverse elements)
- Use "Big-O" notation to analyze algorithms
- Produce effective and efficient programs to solve complex practical problems using appropriate data structures and algorithms, and then use appropriate design, debugging, and testing

techniques

- Recognize the need for, and have the ability to, program in a consistent and well accepted coding style

## Attendance and Course Communications

Attendance is expected and excessive absences will be noted. Be sure to let the instructor know about any anticipated absences in advance. If you miss a class, ensure to get the missed material from a classmate. Please be on time to class sessions---lateness is disruptive to the class.

Students failing to attend the first two class meetings may be dropped from the course.

You must obtain the instructor's advance permission to use any recording device, computer, or other electronics during lecture. No phone or network use during lecture. Phones, and audio devices must be silenced or turned off in the classroom. No food or tobacco in the classroom.

The [course calendar](https://cs.mtsu.edu/~sbarbosa/3110/calendar.html) (<https://cs.mtsu.edu/~sbarbosa/3110/calendar.html>) contains the schedule for exams, labs and assignments. You are responsible for checking the calendar and monitoring for course e-mails daily on weekdays. All course-related e-mail will be sent to your [MTMAIL](#) account; in turn, you are required to use your [MTMAIL](#) account when communicating with the instructor. (Note: The instructor does not send or receive correspondence via D2L; please do not try to contact the instructor through D2L.)

## Grading

### Graded Components

#### Attendance and Class Participation

You should be in class whenever we meet, and should participate by asking questions and joining in on discussions. Unannounced quizzes may be given on any lecture period, and no makeup opportunities will be provided.

#### Projects

Programming assignments are classified as projects and must be turned in by midnight (defined to be 11:59pm) on the due date. **NO PROJECTS WILL BE ACCEPTED LATE.** You must work independently on assigned projects, and you may NOT discuss them with or seek assistance from fellow students. If it is determined that students have collaborated on projects, all those involved will receive a zero for the assignment.

#### Homework

Homework assignments will be completed [D2L](#), except where noted otherwise by the instructor. For non-D2L assignments the method of submission and final form (written or typed) will be announced with each homework. Both paper assignments and electronic submissions are possible. To aid the orderly processing of collected paper assignments, the following guidelines are to be used. Unless otherwise directed, turn in paper assignments to the instructor in person or place in the instructor's mailbox in KOM 306. All non-computer assignments must be turned in on 8 1/2 by 11 inch paper. Multiple sheets must be stapled together. In the upper right-hand corner of the top sheet: put your name on one line; the course id, section, and instructor's name on the next; the assignment id on the third; and the due date on the fourth. For example the first exercise for section 001 of the 3110 course would have:

Your Name  
CSCI 3110-001 (Dr. Barbosa)  
Homework #1  
Due: mm/dd/yy

In all cases, homework is due at the beginning of class on the date due. **NO HOMEWORK ASSIGNMENT WILL BE ACCEPTED LATE.**

#### Exams

Three non-comprehensive exams are planned during the semester, and no makeup exams will be given unless documented extenuating circumstances are presented to, and accepted by, the instructor. Exam 3 will be held during the final exam period, per the course calendar.

**NOTE:** Any questions or disputes concerning a grade on a project, exam, or homework must be handled within **one week** of the time the item was returned.

#### Final Grade Weighting

Attendance and Class Participation	5%
Homework	15%
Projects	35%
Exams	45%

#### Grading Scale

A	90-100	B+	87-89	C+	77-79	D+	67-69	F	<60
		B	83-86	C	73-76	D	63-66		
		B-	80-82	C-	70-72	D-	60-62		

If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with the instructor as soon as possible. Any student interested in reasonable accommodations can consult the *Disability & Access Center (DAC)* website [www.mtsu.edu/dac](http://www.mtsu.edu/dac). Students may also contact the *DAC* for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973.

## Academic Misconduct

Academic misconduct includes cheating, plagiarizing, research misconduct, misrepresenting one's work, and inappropriately collaborating. This applies to all work students turn in for evaluation or course credit. Definitions of misconduct can be found in the The Computer Science Department's [Policy on Academic Integrity](#). If a student is found responsible for committing an act of academic misconduct, he/she will be receive an F in the course, and will be reported to the university.

## Tennessee Education Lottery Scholarship

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility. If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time. For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your MT One Stop Enrollment Coordinator (<http://www.mtsu.edu/one-stop/counselor.php>).

## Free Tutoring

Learn how to study, get help with understanding difficult course material, receive better test grades, or simply improve your grade point average. Take advantage of our FREE tutoring that is available to you as an MTSU student. Tutoring is available in study skills and learning strategies, and over 180 courses including biology, history, computer information systems, physics, math, psychology, chemistry, economics, recording industry, and many more. The central location for tutoring is the Tutoring Spot, located in Walker Library. Tutoring is also conducted at various other campus sites. For available tutoring opportunities, visit [The Tutoring Spot](#). For questions, call the Tutoring Spot at 615-904-8014. The Computer Science Department offers free tutoring. The CS student tutors are located in KOM 363, off the main hallway. Please check their door for operating hours.

## Reporting of Unofficial Withdrawals

Federal regulations require that students who cease class attendance but do not officially withdraw from the University must be reported so that future financial aid will cease and/or the student will be required to return funds. Therefore, during the term I will be required to complete a roster indicating those students who have stopped attending class without officially withdrawing. Faculty members are not required to check attendance each day; however, I may use project submission deadlines, exams, quizzes, advising appointments, or other methods I choose to determine unofficial withdrawals.

## Accreditation Activities

Samples of graded work may be collected for our accreditation team. Identifying information will be removed from any such work collected.

## Useful Links



# Lab Syllabus - CSCI 3130

## Assembly and Computer Organization

### Instructor Information

LAB ASSISTANT(s): Ivan Syzonenko ([is2k@mtmail.mtsu.edu](mailto:is2k@mtmail.mtsu.edu))

OFFICE: KOM 450

OFFICE HOURS: by appointment only

LAB HOURS: Friday, 9:10 AM – 11:10 AM in KOM 350/360

WEB SITE: <https://www.cs.mtsu.edu/~is2k/3130/>

### Lab Information

#### Summary

This class will use two different types of labs: Open and Closed. During the lecture portion of this class, you will learn the basics of computer architecture theory and design. In lab, you will demonstrate knowledge and gain experience in the actual development of a relatively simple computer (RSC) architecture. Using the software package Logisim, you will design, construct, and demonstrate circuits throughout the semester. There will normally be a Closed Lab each week which will be performed within the computer lab and under strict time limits. Open Labs will be assigned during this time as well and should be constructed outside of lab time during the following week.

#### Class Flow

You will be introduced to the theory needed to perform Open/Closed Lab projects usually during the preceding lecture time. Your lab assistant will introduce Open/Closed Lab projects and make initial, very important announcements at the beginning of the lab time. Therefore, make sure that your attendance for the lab is prompt. The lab assistant will normally have your previous lab graded by the next lab period. After graded labs are returned, the lab assistant will patrol the class looking for questions regarding the current assignment. PLEASE ASK QUESTIONS IF YOU HAVE THEM! *The lab assistant cannot know if there is an issue with the lab unless he receives questions regarding that issue.* The lab assistant can answer questions pertaining to the use of the software and the theory behind the lab. *THE LAB ASSISTANT WILL NOT GIVE DIRECT ANSWERS TO THE LABS.*

Some labs, both Open and Closed, are accessory labs that cover an important component of theory, but the VAST MAJORITY of the labs depend on each other and are pieces for the FINAL PROJECT (RSC). The FINAL PROJECT will require you to construct the computer that you have designed and built throughout the semester. Therefore, it is of UTMOST IMPORTANCE that you complete each lab and do each lab correctly.

#### Lab Submissions

All lab assignments should be submitted to the coursework submission website, as described in the class syllabus. If a lab assignment is submitted multiple times, *the lab with the most recent submission date will be graded.* Closed Labs are due by the end of the closed lab session for that day. Open Labs are due by the date and time given for that particular lab assignment (typically, by the end of the closed lab for the following week). All submissions are to be zipped (.zip file archive) regardless of the number of files prior to uploading to the assignment submission system.

Label **all** of your circuits **and** any associated files in the upper left corner with:

Your Name  
Lab #  
Circuit Name

#### Late Lab Submissions

Labs, both Open and Closed, will not be accepted late (but please refer to the lab resubmission policy below). All assignments are due on the date that is specifically set. Extensions will only be given for extenuating circumstances and only with *prior approval* of the lab assistant or Dr. Phillips.

#### Attendance

Attendance of Closed Labs is **mandatory**. A roll will be taken during each lab.

**IT IS YOUR RESPONSIBILITY TO SIGN THE ROLL SHEET!** Non-attendance of a lab will result in a maximum grade of 1/2 its full-point value unless special arrangements have been made prior to the lab. (A typical Closed Lab is worth 10 points, thus the maximum grade would be 5 points minus any points off for errors.) Most of the labs are related to building the RSC, therefore any student who misses a lab, with or without prior approval, must make up the work in order to finish the final project. The labs are changed on occasion as minor corrections or adjustments are made. Therefore, having taken CSCI 3130 in a prior semester does not relieve students from attending lab. Tardiness may result in a reduced grade for the closed lab.

### Performance Evaluation

There will be approximately 12 Closed Lab assignments, 8 Open Lab assignments, and a Final Project (RSC). The following explains how much each lab assignment is worth:

Closed Labs	Open Labs	Final Project (RSC)
10 points each	20 points each	100 points

#### Grading Principles

All labs will be graded on correctness and adherence to the lab specifications below. Closed Lab assignments are due by the end of the assigned lab session, and Open Lab assignments are due by the end of the subsequent lab session (unless the lab specifically states otherwise). Late work will NOT be accepted unless explicit permissions have been given to you by the lab assistant and Dr. Phillips. However, all labs should be submitted to determine correctness since the FINAL PROJECT requires that all previous

labs have been completed.

1. Grades for lab assignments will be recorded on D2L, and feedback on lab assignments will be provided via the course assignment submission system. Students should always check grades and download relevant feedback from the assignment submission system **before** lab time. If no errors were found with the circuit(s), you will receive simple feedback indicating the circuit tested properly and a final grade. If errors were encountered, a note will be left in the submission system feedback for that assignment or provided by email. Additionally, a grade of zero (0) will be assigned until all errors are corrected so that a final point value can be determined (see item 2 below).
2. The labs, both Open and Closed, differ significantly from the labs of other classes. Unlike most other classes, the Open and Closed labs in 3130, excluding a very few, build upon one another to produce the Relatively Simple Computer (RSC). Therefore, it is critical that any and all errors be corrected for these assignments. If a submitted lab assignment is found to contain any errors during grading, then *until all errors are corrected* the recorded grade for the lab will remain a zero (0). All such labs will need to be corrected and resubmitted in a timely manner if errors are found during grading. Following grading of labs, the course submission system will allow for resubmissions before the end of the subsequent lab session.
3. Labs submitted by their initial deadlines and containing no errors will receive 100% credit. Max credit you can receive is 90% for the first resubmission (within 1 week of the initial deadline), 70% for the second resubmission (within 2 weeks of the initial deadline), and 50% for the third resubmission (within 3 weeks of the initial deadline). Therefore, *a potential maximum of three resubmissions is allowed*. After this time, a grade of zero will be given. Additionally, no resubmissions will be accepted after Study Day (the last day before final exams).
4. Assignments are broken up into sections depending on the amount of effort required to complete the assignment. Remember, regardless of error severity, incorrect lab submissions will be returned with a grade of zero (see item 2 above). Penalties for incorrect lab submissions will normally be determined as follows:
  - -10% Minor issues: simple errors and quick fixes that need attention
  - -20% Medium issues: file naming and sub-directory issues, well hidden crossed wire, missing inputs/outputs, etc.
  - -30% Major theory malpractice: bit-width mismatches (8 bits become 12 bits), incorrect part use, very poor design and mass deviation from instructions
  - -50% Critical negligence: plainly obvious errors, mass wire crossing, anything that should have been obvious with quick error checking
5. Since most labs are related to the RSC, all students must correct errors on lab assignments in order to complete the final project (see item 2 above). **NOTE:** Failure to correct errors in previous labs WILL have a direct impact on the final project. **Assistance on the final project may be withheld until all previous labs are corrected.**
6. All lab grades will be recorded on D2L (elearn.mtsu.edu). It is the student's responsibility to make sure that all grades have been recorded properly. If there is any disagreement between the recorded grades, students should be prepared to produce graded labs to document the mistake and notify the lab assistant as soon as possible. Undisputed grades will remain permanent two weeks after initial posting.
7. Because the FINAL PROJECT requires the completion of all previous labs, it is strongly suggested that you maintain back-up copies of all of your work, preferably on a network/cloud drive.

## Course Policies

The CSCI 3130 Labs will adhere to all course policies as specified in the CSCI 3130 class syllabus.

[Joshua L. Phillips](#)  
[MTSU](#) | [CS](#) | [Home Page](#)

Copyright © MTSU  
Last Modified: [January 09 2019 19:45:33](#)



# Syllabus - CSCI 3130

## Assembly and Computer Organization - 4 Credit Hours

### Instructor Information

Dr. Joshua L. Phillips  
Department of Computer Science  
Middle Tennessee State University  
KOM 356  
(615) 494-7965  
[joshua.phillips@mtsu.edu](mailto:joshua.phillips@mtsu.edu)  
<https://www.cs.mtsu.edu/~jphillips/>

### Office hours

M & W (10:00am-11:15am), T & Th (1:00pm-2:00pm), F (11:10am-11:40pm)

### Course Information

#### Lecture

Section 001: Tuesdays & Thursdays: 11:20 AM - 12:45 PM, WPS 102

#### Lab

Section 001: Fridays: 9:10 AM - 11:10 AM, KOM 350/360

Instructor(s): Mr. Ivan Syzonenko - KOM 450 - [is2k@mtmail.mtsu.edu](mailto:is2k@mtmail.mtsu.edu)

#### Final Exam

Section 001: Tuesday, April 30, 2019, 10:30 AM - 12:30 PM, WPS 102

#### Textbook

[Essentials of Computer Organization and Architecture, 3rd Edition \(4th OK\)](#) by Linda Null and Julia Lobur

#### Course Description

Topics include introductory assembly language programming, hardware components of digital computers, microprogramming, and memory management. Laboratory exercises involve the development of assembly language codes, logical and functional properties of components from gates to microprocessors. Basic computer architecture, organization, and function of simple computer systems are presented.

**Pre-requisite:** A grade of "C" or higher in 2170 is necessary to take this course.

#### Learning Outcomes

Upon successful completion of this course, a student will be able to:

- Write assembly language programs using Intel x86-64 and other instruction sets
- Design and implement various combinatorial and sequential circuits
- Understand basic computer organization concepts (CPU design and organization)
- Understand both hardware and micro-programmed design control units
- Understand the concepts involved in the memory hierarchy of a computer

#### Website

The course website is at <http://www.cs.mtsu.edu/~jphillips/courses/CSCI3130/>. Announcements and assignments will be posted there and/or emailed to your Pipeline email address. You are expected to monitor the website and your email account frequently (i.e., at least every other day).

#### Email

You must be able to read and respond to e-mails sent to your university Pipeline account. If you'd rather not use MTMail as your primary e-mail system, Dr. Untch put together a tutorial for redirecting your MTMail e-mail to a system you prefer: <https://www.cs.mtsu.edu/~untch/share/HowToAvoidUsingMTMail.pdf>. Additionally, I do **not** use or check the D2L email account.

#### Lecture

Attendance is required by the university. If you cannot make a lecture, please inform me and get the relevant materials from a classmate.

Computers are permitted in lecture for note taking. Other activities such as web surfing, stock trading, and social networking are inappropriate. Not only do they distract you but also others.

Students that do not attend the first 2 lectures may be dropped from the course.

An audible cell phone ring during class will require the possessor to bring cookies (or equivalent) for the entire class at the following lecture.

Additionally, all views are to be heard and engaged respectively. As scholars, we are expected to analyze subject matter critically and express reasonable positions that are based on facts, reason, and balanced emotion.

## Homework

Homework assignments are due at 11:00 PM on the assigned due date unless specified otherwise. Include a header with each submitted homework assignment with the following information:

- Full Name
- CSCI 3130
- Assignment name
- Date

**Late homework assignments will NOT be graded.**

## Labs

The first two open lab assignments may be turned in late at a penalty of 10% for the first day late, 30% for the second, 50% for the third, and will not be accepted after the third day late (Sunday does not count towards this penalty).

Policies regarding all other closed and open lab assignments are described in the [CSCI 3130 Lab Syllabus](#).

## Supplies

We will be using Logisim (a hardware simulator program) in the lab. You will need an external storage medium in order to retain assignments (e.g. A USB flash drive, Google Drive, or Dropbox are options to consider.) You may also wish to use Logisim on your home computer once assignments are given. Logisim is free and can be downloaded from <http://www.church.com/logisim/> (please use version 2.7.1). If you do not have the ability or desire to download Logisim to your computer, you may access the software remotely via Remote Desktop to shemp.cs.mtsu.edu (use your CS account credentials).

## Submitting Assignments

All assignments must be submitted to <https://3130.cs.mtsu.edu/> for grading. When prompted, use your *personal* CS account credentials to gain access. The username for your personal CS account is the same as your pipeline ID (two to three letters, a single digit followed by a letter). If you don't have a CS account that matches your pipeline ID, request one at <https://mgt.cs.mtsu.edu/arul/>. For the password for <https://3130.cs.mtsu.edu/>, use your CS account password (and not your pipeline password).

For homework assignments, late submissions **will be ignored**.

All assignments uploaded to the incorrect dropbox **will be ignored**.

All assignments submitted using any other method **will be ignored. (no email, no D2L, no hardcopies, no etc.)**

## Advice for Succeeding in this Course

- Attend **EVERY** class.
- Be prepared for class by reading/viewing assigned material before class.
- Take notes in class.
- Review notes taken in class.
- Start working on the labs and homework as soon as possible, and seek help as soon as needed. Do NOT wait for the last minute to work on your labs.
- Ask questions during class or after class. Do NOT wait until test time to ask all of your questions.
- Find study partners/teams to study together (but do your own work).
- Do your own work; zeros can drastically hurt your grade.

## Debugging Protocol

General steps for addressing a coding challenge:

1. Use a debugger to investigate the issue (e.g., what are the values of the variables when the problem occurs)
2. Isolate the problem and replicate it in the simplest form possible
3. Search for answers (e.g., in the book, on-line, etc.)
4. Ask the tutors in the Tutoring Lab
5. If you've already spent an hour trying to solve the problem consider contacting the professor

## Performance Evaluation

Homework	10%
Lab Assignments	40%
Exams	30%
Final Exam	20%

## Grading

The following grading scale will be used in this class:

	A 90-100	
B+		B- 80-82
87-89	83-86	
C+		C- 70-72
77-79	73-76	
D+		D- 60-62
67-69	63-66	

F  
< 60

Grades for assignments, labs, exams, etc. will be posted in D2L. Approximately 3 in-class exams will be given. Each missed exam will be given zero points. Students are expected to complete all projects and assignments. Any questions concerning a grade on a homework, lab, or exam must be presented within one week of when the item was returned. A grade of "I" will be given only in accordance with University policy. The last day to drop without a grade is **January 27, 2019**. The last day to drop with a grade of "W" is **March 24, 2019**.

## Course Policies

### Honor Code

It is expected that all work for this class (including exams, homework and labs) is your own. The university policy for academic misconduct is as follows: Middle Tennessee State University takes a strong stance against academic misconduct. Academic Misconduct includes, but is not limited to, plagiarism, cheating, and fabrication.

Academic Misconduct: Plagiarism, cheating, fabrication, or facilitation of any such act. For purposes of this section, the following definitions apply:

1. Plagiarism: The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper acknowledgment.
2. Cheating: Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term academic exercise includes all forms of work submitted for credit or hours.
3. Fabrication: Unauthorized falsification or invention of any information or citation in an academic exercise.
4. Facilitation: Intentionally or knowingly helping or attempting to help another to violate a provision of the institutional code of academic misconduct.

To be clear, going online and using information without proper citations, copying parts of other student's work, creating information for the purposes of making your paper seem more official, or anything involving taking someone else's work without proper attribution is academic misconduct. If you work together with other students on an assignment when it is not allowed, it is academic misconduct. All cases of academic misconduct will result in a minimum penalty of zero credit for the associated assignment. They may also result in failure in the course. For more information, please refer to the following links:

[Computer Science Department Policy on Academic Integrity](#)

[MTSU's Academic Integrity and Misconduct Policy](#)

### Financial Aid Notice

Students receiving any form of financial aid should always consult the Financial Aid Office before dropping a course. For additional information, contact the Financial Aid Office (898-2830) or see <http://www.mtsu.edu/financialaid>.

### Lottery Scholarship Information

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you may not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

The MT One Stop is located in Room 210 of the Student Services & Admissions Center (SSAC). If you have additional questions about financial aid, registration, tuition and billing and transcripts, please contact your [MT One Stop Enrollment Counselor](#) or come by the MT One Stop.

### Reporting of Unofficial Withdrawals

Federal regulations require that students who cease class attendance but do not officially withdraw from the University must be reported so that future financial aid will cease and/or the student will be required to return funds. Therefore, during the term I will be required to complete a roster indicating those students who have stopped attending class without officially withdrawing. Faculty members are not required to check attendance each day; however, I may use project submission deadlines, exams, quizzes, advising appointments, or other methods I choose to determine unofficial withdrawals.

### Reasonable Accommodation for Students with Disabilities

If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please contact the Disability & Access Center (DAC) as soon as possible. The DAC is located in Keathley University Center (KUC), room 121. Office phone: 898-2783 or Email: [dacmail@mtsu.edu](mailto:dacemail@mtsu.edu).

### Title IX Information and Resources

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX site for contact information and details: <http://www.mtsu.edu/titleix/>

### Accreditation Activities

Samples of graded work may be collected for our accreditation team. Identifying information will be removed from any such work collected.

[Joshua L. Phillips](#)  
[MTSU | CS | Home Page](#)

Copyright © MTSU  
Last Modified: **January 14 2019 12:32:21**



# **Computer Systems (CSCI 3240 and 6050)**

## **Syllabus**

### **Spring 2019**

**Professor:** [Ralph M. Butler](#)

#### **Office Hours:**

MW 2:45pm - 4:15pm  
TR 2:30pm - 3:30pm  
other by appointment

#### **Office and Lab Hours for Muhammad Abed:**

lab (360):  
MW 7:30 PM - 8:30 PM  
office (451):  
TR 4:00 PM - 5:00 PM  
other by appointment

lab monitor (350):  
MTWRF 1:00 PM - 4:00 PM

#### **Undergrad Catalog Description:** ([Click Here](#))

**Texts:** Computer Systems: A Programmer's Perspective by Bryant and O'Hallaron

[Textbook Web Site](#)

#### **Testing and Grading Procedures:**

There will be no exams. There will be 5-7 programming projects.

The final grade will be the (weighted) average of the project scores.

The standard grading scale will be used:

- A 90-100
- B 80-89
- C 70-79
- D 60-69
- F 0-59

#### **Projects:**

The projects will develop and/or exploit a wide variety of system-level operations on a 64-bit Unix platform. All projects will be done on a 64-bit Unix system as discussed in class.

You are assumed to have a reasonable programming proficiency in C/C++ and to have a reasonable working knowledge of Unix.

It is your responsibility to see that assignments and projects are turned in ~~on time~~. Late work will only be accepted with a medical (or similar) excuse.

It is your responsibility to request (or re-activate) an account on the CS dept linux systems for use in this class. The account name **MUST** match your pipeline ID.

## Learning Outcomes Include:

- Data Representation
- Linking and Loading
- Exceptional Control Flow
- Virtual Memory Concepts
- System-Level I/O
- Network Programming
- Concurrent Programming

**Attendance:** Attendance is required by the university. If you miss a class, it is your responsibility to discover the material covered from a classmate.

**Communication:** I will use your official MTSU email as a means to communicate new information to you. For the purposes of this course, I will assume that you check your email regularly. If you elect to forward your email, I will NOT try to handle mail that bounces.

**Academic Honesty:** All work for this class is to be done on an individual basis. The penalty for unauthorized collaboration will range from a grade of zero for an assignment to a failing grade for the course. The Computer Science Academic Integrity Policy may be viewed [here](#).

**Reasonable Accommodation for Students with Disabilities:** Reasonable Accommodation for Students with Disabilities: If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with the instructor as soon as possible. Any student interested in reasonable accommodations can consult the Disability and Access Center (DAC) website [www.mtsu.edu/dac](http://www.mtsu.edu/dac). Students may also contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973.

# CSCI 4330/6330, Parallel Processing Concepts Spring 2019 Syllabus

**Professor/email/website:** Dr. C. Pettey/ chrisila.pettey@mtsu.edu / <http://www.cs.mtsu.edu/~pettey>

**Professor's Office/Phone:** KOM 362 / 898-5737

**Office Hours:**

MW 3:20 – 4:20

TR 1 – 4

Others by appointment

**Time/Room/class website:** MWF 10:20 – 11:15/ KOM 307 / [www.cs.mtsu.edu/~pettey/4330](http://www.cs.mtsu.edu/~pettey/4330)

**Goal:** This course provides an introduction to the basic concepts in parallel processing and an introduction to programming in a parallel environment. Specifically, students will be introduced to both the classifications of parallel architectures and the actual architectures of at least two parallel environments, and provided an opportunity to program and debug in a parallel environment.

**Learning Outcomes:**

- Students will be able to write programs consisting of multiple shared memory processes.
- Students will be able to write programs consisting of multiple distributed memory processes.
- Students will answer written questions over the basic concepts in parallel processing.

**Prerequisites:** In order to take 4330/6330, you must have made a grade of C or better in CSCI 3240 or CSCI 6050. You must also have a working knowledge of C or C++.

**Suggested textbook:** *Introduction to Parallel Computing* Second Edition by Grama, Gupta, Karypis, and Kumar, Pearson/Addison-Wesley, 2003. ISBN# 0 201 64865 2

**Testing and grading procedures:**

**Tests:** There will be 4 in class 100-point exams given throughout the semester. These will cover lectures, assigned readings, homework assignments, etc. If, for some unavoidable reason you must miss a test, see me about the possibilities of a makeup. Unexcused absences will NOT be allowed to makeup tests. The test dates are: January 30, 2019, March 1, 2019, April 1, 2019 (not a joke), and April 24, 2019.

**Final Exam:** There will be no final exam for this course

**Team projects:** There will be two team projects. Projects are worth 50 points each.

**Laboratory assignments:** There will be 6 - 8 laboratory assignments worth 25 points each. All assignments are due before 11:59pm on the due date, and no late assignments will be accepted. All programs will be written in C. Labs will be submitted using the turnin program from your personal Linux account (i.e., NOT another class' "c" account).

**Extra credit policy:** In general, extra credit is not an option in this class. In the highly unlikely event that an exception is made to this rule, the entire class will be given the option of doing the extra credit.

**Collaboration:** Collaboration on assignments other than group projects is not allowed! See [the departmental policy on academic integrity](#) for a description of unacceptable collaboration. A link to this site is also on the course web page. It should be noted that each instance of academic misconduct will result in a

grade of zero for the first instance and a grade of zero for the course for a second instance.

**Letter grades:** Letter grades are determined by adding points earned and dividing by the possible number of points, then applying the following scale.

0 - 59 F; 60 - 69 D; 70 - 79 C; 80 - 89 B; 90 - 100 A

I reserve the right to give plusses and minuses, but I will not lower your grade from the above scale. For example, if you make a 79, there is a HIGHLY UNLIKELY possibility that I might give you a C+ and an even less likely possibility that I might give you a B-. But if you make a 70 I will NOT give you a C-.

**Attendance Policy:** Attendance is taken every class meeting by signing the attendance sheet. It should be understood that LACK OF ATTENDANCE will probably affect your grade in a negative manner. However, your grade will not be lowered by me simply because you choose to be absent.

**Email Policy:** If I need to contact students, I will use the mtmail email. If you need to contact me, use the mtsu email ([chrisila.pettey@mtsu.edu](mailto:chrisila.pettey@mtsu.edu)). I do NOT read D2L email. I will not discuss grades via email. I only guarantee to read email M – F between the hours of 8 and 4. While I may read email at other times, there is no guarantee that I will. So wait at least 24 normal business hours after sending an email before sending a follow-up inquiry.

**Electronic Devices:** USE OF ELECTRONIC DEVICES IS NOT ALLOWED in lecture or in lab unless otherwise permitted by the instructor. This includes, but is not limited to, phones, laptops, tablets, and smart watches. Phones must be turned off or on silent and placed inside your bag at all times. This is in compliance with the College of Basic and Applied Sciences Policy for Appropriate Use of Hand-held and Wireless Technology (see Handout #3). Additionally, students are not permitted to take photos or record any part of a class/lab/other session unless explicitly granted permission by the instructor or the MTSU Disability Access Center. Sanctions for violation of this policy will be determined by the instructor and may include dismissal from the class, attendance penalties or loss of class participation points, zero grades on quizzes or examinations, failure in the class, or other penalties that the instructor determines to be appropriate.

All course materials are protected by the law of copyright. Students are not authorized to use, reuse, reproduce, distribute, broadcast or publish the course materials, or any part of the course materials, in any medium, including on social media. This means that students are not allowed to photograph or reproduce course materials (for example, class PowerPoint slides), and that students are not allowed to record lectures, except as provided for by an approved ADA request. It also means that students are not allowed to distribute any course materials via any means, including via the internet and social media sites, including those such as GroupMe which primarily are accessed by cell phone.

**Academic Integrity/Misconduct:** Please review the information on Academic Integrity and Misconduct (<http://www.mtsu.edu/provost/acadmisconduct.php>). Academic integrity is a hallmark of Middle Tennessee State University. We expect students to complete academic exercises, i.e., assignments turned in for credit, that are original and appropriately credit all sources used.

Academic misconduct includes, but is not limited to:

1. Plagiarism: The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper attribution. This includes self-plagiarism, which occurs when an author submits material or research from a previous academic exercise to satisfy the requirements of another exercise and uses it without proper citation of its reuse.
2. Cheating: Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. This includes unapproved collaboration, which occurs when a student works with others on an academic exercise without the express permission of the professor. It also includes purchasing assignments or paying another person to complete a course for you.
3. Fabrication: Unauthorized falsification or invention of any information or citation in an academic exercise.

Going online and using information without proper citation, copying parts of other students' work, creating information to establish credibility, or using someone else's thoughts or ideas without appropriate acknowledgment is academic misconduct. If you have a question about an assignment, please ask me to clarify. All cases of academic misconduct will be reported to the Director of Student Academic Ethics and may result in failure on the test/assignment or for the course.

When students participate in behavior that is considered to be academic misconduct, the value of their education and that of their classmates is lessened, and their academic careers are jeopardized.

Students guilty of academic misconduct are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions (including expulsion from the university), which may be imposed through the regular institutional procedures as a result of academic misconduct, the instructor has the authority to assign an "F" or zero for an activity or to assign an "F" for the course. Students guilty of plagiarism will be immediately reported to the Director of Student Academic Ethics.

If using Turnitin.com to review work for originality, include information on how the tool is to be used, if the papers will be submitted to the Turnitin database and if students will have the opportunity to review the report generated.

The Computer Science Department's Policy on Academic Integrity (<https://cs.mtsu.edu/~csdept/Academics/academicIntegrity.htm> Handout #4) applies to this course. Unless otherwise directed, work alone on open lab assignments. The penalty for unauthorized collaboration will range from a grade of zero for an assignment to a failing grade for the course.

## **STUDENT RESOURCES**

Frequently Used Student Resources can be found at <http://www.mtsu.edu/university-college/forms.php#StudentSupport>

### **Technical Support**

Students who experience problems with D2L or wireless connectivity issues, should be encouraged to contact the MTSU Help Desk online (24/7) or at 1-615-898-5345.

Students who experience problems with the Department of Computer Science servers/lab machines/software should let their lab assistant know.

### **Students with Disabilities**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). Also, if you require the use of assistive technology, please make sure to download the documents in order to access the accessibility that I have built into the content for you.

### **Hope (Lottery) Scholarship Information**

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you may not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form or contact your MT One Stop Enrollment Counselor.

### **Grade Appeals**

University Policy 313, Student Grade Appeals, provides an avenue for MTSU students to appeal a final course grade in cases in which the student alleges that unethical or unprofessional actions by the instructor and/or grading inequities improperly impacted the final grade.

### **Title IX**

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX site (<http://www.mtsu.edu/titleix>) for contact information and details.

**Inclement Weather Policy:** Unless the university is closed, I will meet class, so do not call the office. However, if the school system in your county of residence is closed for bad weather, you have an excused absence from this class.

**Free Tutoring:** Take advantage of our FREE tutoring service and learn how to study, get help with understanding difficult course material, receive better test grades, or simply improve your grade point average. Tutoring is available in *study skills* and *learning strategies* that includes sessions on time management, note taking, when and where to study, and memory principles. Tutoring is also available in over 200 courses including biology, history, computer information systems, physics, math, psychology, chemistry, economics, recording industry, and many more. The central location for tutoring is the Tutoring Spot, located in Walker Library, but is also conducted at various other campus sites. For available tutoring opportunities, visit <http://mtsu.edu/studentsuccess/tutoring.php#on>. For questions, call the Tutoring Spot at 615-904-8014.

Middle Tennessee State University  
Computer Science Department

## Data Communication and Networks (CSCI 4/5300) Syllabus Fall 2018

### General Information

Instructor:	Yi Gu
Office room:	KOM 301A/B (Kirksey Old Main Building)
Office hours:	M 11:15 am – 12 pm W 11:15 am – 12 pm 3:45 pm – 4:15 pm F 11:15 am – 12 pm 1 pm – 3 pm (Others by appointment or walk in at your convenience)
E-mail:	<a href="mailto:Yi.Gu@mtsu.edu">Yi.Gu@mtsu.edu</a>
Office phone:	(615) 904-8238
Homepage:	<a href="https://cs.mtsu.edu/~yigu/">https://cs.mtsu.edu/~yigu/</a>
Department office:	KOM 306
Department phone:	(615) 898-2397

### When and Where

Aug. 27, 2018 – Dec. 5, 2018  
2:20 pm – 3:45 pm MW KOM 307

### Course Description and Objectives

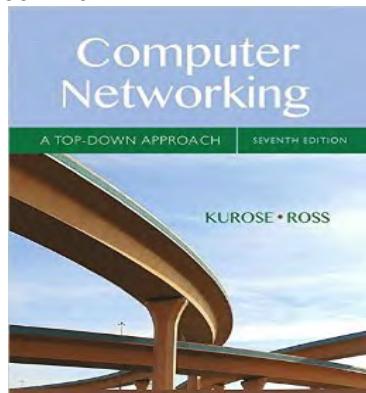
Fundamentals of Microcomputer connectivity and communications. Local and wide area network basics, networking architecture and standards. Network protocols, including TCP/IP, HTTP, FTP, routing protocols, etc.. Modeling, analysis, design, and management of hardware and software on a computer network. Emphasis on application-layer paradigms and application programming interfaces, and encourage a hands-on experience with protocols and networking concepts.

### Prerequisite

CSCI 3240 (Introduction to Computer Systems) or CSCI 3250 (Operating Systems).

### Textbooks

Computer Networking: A Top-Down Approach, 7th edition. Jim Kurose, Keith Ross, Pearson, 2016. ISBN-10: 0133594149, ISBN-13: 978-0133594140.



## **Supplementary Materials and Other Resources**

Additional reading material including reference books and online resources may be assigned for some advanced topics as the course proceeds. Some useful resources can also be found on the student companion web site from the authors or the publishers.

## **Course Content Outline\***

Week	Chapter	Topic
1 - 6	1	Computer Networks and the Internet
	2	Application Layer
	3	Transport Layer
	4	The Network Layer: Data Plane
7	Review and Catchup Comprehensive Test 1	
8-14	5	The Network Layer: Control Plane
	Oct. 13-16, Fall break	
	6	The Link Layer and LANs
	7	Wireless and Mobile Networks
	8	Security in Computer Networks
	9	Multimedia Networking
	Nov. 21-24, Thanksgiving	
15	Review and Catchup Project demo Q&A Comprehensive Test 2	

\* Slight modification may be adopted as the course proceeds.

## **Evaluation and Grade**

Grading Components	
<b>Attendance</b>	10%
<b>Homework</b>	20%
<b>Small Tests</b>	20%
<b>Project</b>	15%
<b>Comprehensive Test 1</b>	15%
<b>Comprehensive Test 2</b>	20%

- 1) Attendance – All students are expected to attend classes and to participate in classroom discussion. Throughout the entire semester, the roll will be called in 10 randomly selected classes. **If you miss one, 1 point will be directly deducted from your final grade unless prior arrangements are made with the instructor. A posterior one will not be accepted.** Absences do not excuse one from class responsibilities. **Students are responsible for making up any material missed during an absence.** Also, students are expected to be on time for class and remain in class until dismissal, with cell phones on vibrate. (*Communication with the instructor is crucial. Please let me know right away of any complications or concepts you don't understand!*)
- 2) Homework – Total **8 assignments**. A description of the problems and a due date will be given for each assignment.

- 3) Tests – Total **4 small tests** (closed book, no cheat sheet) throughout the semester, each of which contains about 15 multiple choice and 10 true/false). **Only one lowest grade will be dropped** when calculating the final grade. **No make-up tests (no exceptions)!!!**
- 4) Project – To be decided and posted as the course goes on. Basic programming skills are needed.
- 5) Comprehensive Tests – The tests will be **closed book** (no discussion, textbooks, lecture notes nor computers), but one **cheat sheet (letter-size, two-sided paper) might be allowed** to use during the test. A simple calculator may be also allowed during the test if needed. **No make-up comprehensive tests** unless prior arrangements are made with the instructor due to certain emergency!

### **How to Submit Assignments for Grading**

Each assignment will give specifics as to what should be turned in for grading and how this is to be turned in. For the most part, you will be asked to place things in a drop box at the <http://elearn.mtsu.edu> web site.

- Locate the menu item called **Dropbox** at the top left of the D2L header.
- Click **Dropbox**.
- Click on the assignment to be submitted for grading.
- Click **Browse** to locate the correct **file**.
- Click **Submit**.

The students are expected to complete work on schedule. The late policy for all assignments is listed as below:

- **10% points off**, if submitted within 24 hours after the due date;
- **30% points off**, if submitted 24-48 hours after the due date;
- **No credit** if submitted two days or more days after the due date unless prior arrangements are made with the instructor with acceptable reasons.

Grading Scale	Grade**
<b>A- / A</b>	90-93.99 / 94-100
<b>B- / B / B+</b>	80-83.99 / 84-86.99 / 87-89.99
<b>C- / C / C+</b>	70-73.99 / 74-76.99 / 77-79.99
<b>D- / D / D+</b>	60-63.99 / 64-66.99 / 67-69.99
<b>F</b>	0-59.99

*\*\* It is your responsibility to keep all assignments and exams. I will post my grade book on D2L. If any question arises concerning my record of a grade, it is your responsibility to provide the item with the grade in question. Final grades will not be curved unless necessary.*

### **Academic Misconduct**

The use of a third party to submit a student's work is only allowed when accommodations are approved by the Disabled Student Services Office. Students found to be in violation of this policy will be reported to the faculty member and Dean of Student Affairs.

Students should be familiar with the "MTSU Students Rights and Responsibilities" handbook which outlines academic misconduct including plagiarism, cheating, fabricating or facilitating any such act. The Handbook also provides a statement of community standards of civil behavior and code of computer use.

If plagiarism or cheating occurs, the student will receive an F grade on the assignment and (at the instructor's discretion) an F grade for the course.

([http://www.mtsu.edu/provost/fac\\_handbook/Academic\\_Misconduct\\_Syllabus.pdf](http://www.mtsu.edu/provost/fac_handbook/Academic_Misconduct_Syllabus.pdf))

## **Students with Disabilities**

Qualified students with disabilities will be provided reasonable and necessary academic accommodations if determined eligible by the Office of Disabled Student Services (DSS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility from the Office of Disabled Student Services. It is the student's responsibility to initiate contact with the DSS staff and to follow the established procedures for having the accommodation notice sent to the instructor.

## **Technical Support**

Students who experience problems logging into their course, timing out of their course, using the course web site tools or experience other technical problems, should be encouraged to contact the MTSU Help Desk online (24/7) or at 1-615/898-5345.

## **Financial Aid Notice**

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your MT One Stop Enrollment Coordinator (<http://www.mtsu.edu/one-stop/counselor.php>).

# Syllabus - CSCI 4350/5350

## Introduction to Artificial Intelligence - 3 Credit Hours

### Instructor Information

Dr. Joshua L. Phillips  
Department of Computer Science  
Middle Tennessee State University  
KOM 356  
(615) 494-7965  
[joshua.phillips@mtsu.edu](mailto:joshua.phillips@mtsu.edu)  
<https://www.cs.mtsu.edu/~jphillips/>

### Office hours

M & W (9:30am-10:30am), T & Th (11:15am-12:15pm)

### Course Information

#### Lecture

Section 001: Tuesdays & Thursdays: 9:40 AM - 11:05 AM, KOM 320

#### Final Exam

Section 001: Thursday, December 13, 2018, 10:00 AM - 12:00 PM

#### Textbook

[Artificial Intelligence: A Modern Approach, 3rd Edition](#) by Stuart Russell and Peter Norvig  
ISBN-10: 0-13-604259-7  
ISBN-13: 978-0-13-604259-4

#### Recommended Reading

[Machine Learning, 1st Edition](#) by Tom Mitchell  
[Neural Networks and Learning Machines, 3rd Edition](#) by Simon Haykin  
[Computational Cognitive Neuroscience, 3rd Edition](#) by R.C. O'Reilly, Y. Munakata, M.J. Frank, T.E. Hazy, and Contributors

#### Course Description

Topics include search strategies, knowledge representation, reasoning, and machine learning methodologies. Applications include expert systems, natural language understanding, and data analysis.

**Pre-requisite:** A grade of "C" or higher in 2170 and 3080 is necessary to take this course.

#### Learning Outcomes

Upon successful completion of this course, a student will be able to:

- Understand the historical development and current trends in the field of AI
- Understand and implement uninformed and informed search strategies
- Understand basic knowledge representation schemes and formal logic based inference
- Understand the planning problem and planning algorithms
- Understand Bayesian network approaches for reasoning under uncertainty
- Understand and implement learning methodologies (e.g. supervised, unsupervised, semi-supervised, reinforcement)

#### Website

The course website is at <http://www.cs.mtsu.edu/~jphillips/courses/CSCI4350-5350/>. Announcements and assignments will be posted there and/or emailed to your Pipeline email address. You are expected to monitor the website and your email account frequently (i.e., at least every other day).

#### Email

You must be able to read and respond to e-mails sent to your university Pipeline account. If you'd rather not use MTMail as your primary e-mail system, Dr. Untch put together a tutorial for redirecting your MTMail e-mail to a system you prefer: <https://www.cs.mtsu.edu/~untch/share/HowToAvoidUsingMTMail.pdf>. Additionally, I don't use or check the D2L email account.

#### Lecture

Attendance is required by the university. If you cannot make a lecture, please inform me and get the relevant materials from a classmate. Computers are permitted in lecture for note taking. Other activities such as web surfing, stock trading, and social networking are inappropriate. Not only do they distract you but also others. Students that do not attend the first 2 lectures may be dropped from the course.

An audible cell phone ring during class will require the possessor to bring cookies (or equivalent) to the next class.  
Additionally, all views are to be heard and engaged respectively. As scholars, we are expected to analyze subject matter critically and express reasonable positions that are based on facts, reason, and balanced emotion.

## Homework

Homework assignments are due at 11:00 PM on the assigned due date unless specified otherwise. Include a header with each submitted homework assignment with the following information:

- Full Name
- CSCI 4350/5350
- Assignment name
- Date

**Late homework assignments will NOT be graded.**

## Labs

Open lab programming assignments are due at 11:00 PM on the assigned due date. Late labs will be reduced by 10% for the first late day and 20% for additional late days (Sunday and Monday are counted as 1 day). For example, a lab that is due on Wednesday at 11:00 PM but was turned in on Monday at 5:00 PM and scored an 85/100 will get a final score of  $85 - (70\% * 100) = 15$ .

Students missing two or more labs will receive an F or FA in this course.  
Start working on your open lab assignments ASAP!

## Submitting Assignments

All assignments must be submitted to <https://4350.cs.mtsu.edu/> for grading. When prompted, use your *personal* CS account credentials to gain access. The username for your personal CS account is the same as your pipeline ID (two to three letters, a single digit followed by a letter). If you don't have a CS account that matches your pipeline ID, request one at <https://mgt.cs.mtsu.edu/arul/>. For the password for <http://4350.cs.mtsu.edu/>, use your CS account password (and not your pipeline password).

For homework assignments, late submissions **will be ignored**.

## Advice for Succeeding in this Course

- Attend EVERY class.
- Be prepared for class by reading/viewing assigned material before class.
- Take notes in class.
- Review notes taken in class.
- Start working on the labs and homework as soon as possible, and seek help as soon as needed. Do NOT wait for the last minute to work on your labs.
- Ask questions during class or after class. Do NOT wait until test time to ask all of your questions.
- Find study buddies to study together (but do your own work).
- Do your own work; zeros can drastically hurt your grade.

## Debugging Protocol

General steps for addressing a coding challenge:

1. Use a debugger to investigate the issue (e.g., what are the values of the variables when the problem occurs)
2. Isolate the problem and replicate it in the simplest form possible
3. Search for answers (e.g., in the book, on-line, etc.)
4. Ask the tutors in the Tutoring Lab
5. If you've already spent an hour trying to solve the problem consider contacting the professor

## Performance Evaluation

Homework	10%
Lab Assignments	40%
Exams	30%
Final Exam	20%

## Grading

The following grading scale will be used in this class:

A	90-100	A-	[90-92]
4350 [5350]	[93-100]		
B+	83-86	B-	80-82
87-89			
C+	73-76	C-	70-72
77-79			
D+	63-66	D-	60-62
67-69			
F	< 60		

Grades for assignments, labs, exams, etc. will be posted in D2L. Approximately 3 in-class exams will be given. Each missed exam will be given zero points. Students are expected to complete all projects and assignments. Any questions concerning a grade on a homework, lab, or exam must be presented within one week of when the item was returned. A grade of "I" will be given only in accordance with University policy. The last day to drop without a grade is **September 9, 2018**. The last day to drop with a grade of "W" is **October 31, 2018**.

## Course Policies

### Honor Code

It is expected that all work for this class (including exams, homework and labs) is your own. The university policy for academic misconduct is as follows: Middle Tennessee State University takes a strong stance against academic misconduct. Academic Misconduct includes, but is not limited to, plagiarism, cheating, and fabrication.

Academic Misconduct: Plagiarism, cheating, fabrication, or facilitating any such act. For purposes of this section, the following definitions apply:

1. Plagiarism: The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper acknowledgment.
2. Cheating: Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term academic exercise includes all forms of work submitted for credit or hours.
3. Fabrication: Unauthorized falsification or invention of any information or citation in an academic exercise.

To be clear, going online and using information without proper citations, copying parts of other student's work, creating information for the purposes of making your paper seem more official, or anything involving taking someone else's work without proper attribution is academic misconduct. If you work together with other students on an assignment when it is not allowed, it is academic misconduct. All cases of academic misconduct will result in a minimum penalty of zero credit for the associated assignment. They may also result in failure in the course. For more information, please refer to the following links:

[Computer Science Department Policy on Academic Integrity](#)

[MTSU's Academic Integrity and Misconduct Policy](#)

### Financial Aid Notice

Students receiving any form of financial aid should always consult the Financial Aid Office before dropping a course. For additional information, contact the Financial Aid Office (898-2830) or see <http://www.mtsu.edu/financialaid>.

### Lottery Scholarship Information

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you may not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

The MT One Stop is located in Room 210 of the Student Services & Admissions Center (SSAC). If you have additional questions about financial aid, registration, tuition and billing and transcripts, please contact your [MT One Stop Enrollment Counselor](#) or come by the MT One Stop.

### Reporting of Unofficial Withdrawals

Federal regulations require that students who cease class attendance but do not officially withdraw from the University must be reported so that future financial aid will cease and/or the student will be required to return funds. Therefore, during the term I will be required to complete a roster indicating those students who have stopped attending class without officially withdrawing. Faculty members are not required to check attendance each day; however, I may use project submission deadlines, exams, quizzes, advising appointments, or other methods I choose to determine unofficial withdrawals.

### Reasonable Accommodation for Students with Disabilities

If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please contact the Disability & Access Center (DAC) as soon as possible. The DAC is located in Keathley University Center (KUC), room 121. Office phone: 898-2783 or Email: [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu).

### Title IX Information and Resources

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX site for contact information and details: <http://www.mtsu.edu/titleix/>

### Accreditation Activities

Samples of graded work may be collected for our accreditation team. Identifying information will be removed from any such work collected.

[Joshua L. Phillips](#)  
[MTSU](#) | [CS](#) | [Home Page](#)

Copyright © MTSU  
Last Modified: **March 18 2019 13:23:06**



# Syllabus - CSCI 4850/5850

## Neural Networks - 3 Credit Hours

### Instructor Information

Dr. Joshua L. Phillips  
Department of Computer Science  
Middle Tennessee State University  
KOM 356  
(615) 494-7965  
[joshua.phillips@mtsu.edu](mailto:joshua.phillips@mtsu.edu)  
<https://www.cs.mtsu.edu/~jphillips/>

### Office hours

M & W (10:00am-11:15am), T & Th (1:00pm-2:00pm), F (11:10am-11:40pm)

### Course Information

#### Lecture

Section 001: Tuesdays & Thursdays: 9:40 AM - 11:05 AM, KOM 307

#### Final Exam

Section 001: Thursday, May 2, 2019, 10:00 AM - 12:00 PM, KOM 307

#### Textbook

[Neural Networks for Pattern Recognition](#) by Christopher M. Bishop  
ISBN-10: 0198538642  
ISBN-13: 978-0198538646

#### Course Description

Topics include the history of neural networks, introduction to machine learning, classification, and regression, fabrication/training/testing of various neural network architectures including single-layer, multi-layer, recurrent, and self-organizing networks. Subtopics include unsupervised learning, reinforcement learning, convolutional networks, and "deep learning".

**Pre-requisite:** A grade of "C" or higher in 3080 is necessary to take this course.

#### Learning Outcomes

Upon successful completion of this course, a student will be able to:

- Understand the historical development and neurobiological underpinnings of neural network theory
- Understand the theoretical and mathematical foundations of learning using neural networks
- Design, train, and performance test various neural network architectures
- Understand both unsupervised and supervised neural architectures
- Understand the role of neural networks in both engineering applications and cognitive neuroscience

#### Website

The course website is at <http://www.cs.mtsu.edu/~jphillips/courses/CSCI4850-5850/>. Announcements and assignments will be posted there and/or emailed to your Pipeline email address. You are expected to monitor the website and your email account frequently (i.e., at least every other day).

#### Email

You must be able to read and respond to e-mails sent to your university Pipeline account. If you'd rather not use MTMail as your primary e-mail system, Dr. Untch put together a tutorial for redirecting your MTMail e-mail to a system you prefer: <https://www.cs.mtsu.edu/~untch/share/HowToAvoidUsingMTMail.pdf>. Additionally, I do **not** use or check the D2L email account.

#### Lecture

Attendance is required by the university. If you cannot make a lecture, please inform me and get the relevant materials from a classmate.

Computers are permitted in lecture for note taking. Other activities such as web surfing, stock trading, and social networking are inappropriate. Not only do they distract you but also others.

Students that do not attend the first 2 lectures may be dropped from the course.

An audible cell phone ring during class will require the possessor to bring cookies (or equivalent) to the next class.

Additionally, all views are to be heard and engaged respectively. As scholars, we are expected to analyze subject matter critically and express reasonable positions that are based on facts, reason, and balanced emotion.

#### Homework

Homework assignments are due at 11:00 PM on the assigned due date unless specified otherwise. Include a header with each submitted homework assignment with the following information:

- Full Name
- CSCI 4850/5850
- Assignment name
- Date

**Late homework assignments will NOT be graded.**

## Labs

Open lab assignments may be turned in late at a penalty of 10% for the first day late, 30% for the second, 50% for the third, and will not be accepted after the third day late (Sunday does not count towards this penalty).

## Final Project

Final projects will be performed in groups assigned near the midterm of the semester. Milestones including working code, associated research paper, and group presentation will constitute the Final Exam for this course.

## Supplies

We will be using JupyterLab/Hub (an interactive IPython Notebook server) hosted on the BioSim cluster to perform neural network modeling and simulation throughout the semester. BioSim will be accessible remotely from any computer with a web browser (suggested: Chrome or Firefox) at [Jupyter1](#), [Jupyter2](#), [Jupyter3](#), or [Jupyter4](#). If you access JupyterLab using a public computer, be sure to **log out** and **close your browser** to protect your data. Most work will be performed in Python programming language using library packages and techniques introduced in class. Python and these packages can be installed locally on your own machine using a Python package manager (eg. pip or anaconda). However, it is expected that you will use BioSim exclusively, so minimal support for local installation will be available.

## Submitting Assignments

All assignments **must** be submitted to <https://4850.cs.mtsu.edu/> for grading. When prompted, use your *personal CS* account credentials to gain access. The username for your personal CS account is the same as your pipeline ID (two to three letters, a single digit followed by a letter). If you don't have a CS account that matches your pipeline ID, request one at <https://mgt.cs.mtsu.edu/arul/>. For the password for <https://4850.cs.mtsu.edu/>, use your CS account password (and not your pipeline password).

For all homework assignments, late submissions **will be ignored**.

All assignments uploaded to the incorrect dropbox **will be ignored**.

All assignments submitted using any other method **will be ignored. (no email, no D2L, no hardcopies, no etc.)**

## Advice for Succeeding in this Course

- Attend **EVERY** class.
- Be prepared for class by reading/viewing assigned material before class.
- Take notes in class.
- Review notes taken in class.
- Start working on the labs and homework as soon as possible, and seek help as soon as needed. Do NOT wait for the last minute to work on your assignments.
- Ask questions during class or after class. Do NOT wait until assignment deadlines to ask all of your questions.
- Find study partners/teams to study together (but do your own work for all homework/lab assignments).
- Do your own work; zeros can drastically hurt your grade.

## Debugging Protocol

General steps for addressing a coding challenge:

1. Isolate the problem and replicate it in the simplest form possible
2. Search for answers (e.g., in the book, on-line, etc.)
3. Use a debugger to investigate the issue (e.g., what are the values of the variables when the problem occurs)
4. If you've already spent an hour trying to solve the problem consider contacting the professor

## Performance Evaluation

Homework	10%
Lab Assignments	50%
Final Project	40%

## Grading

The following grading scale will be used in this class:

4850 [5850]	A 90-100 [93-100]	A- [90-92]
B+ 87-89	B 83-86	B- 80-82
C+ 77-79	C 73-76	C- 70-72
D+ 67-69	D 63-66	D- 60-62

F  
< 60

Grades for assignments, labs, etc. will be posted in D2L. Students are expected to complete all projects and assignments. Students are expected to work independently on all homework and lab assignments. Any questions concerning a grade on a homework, lab, or project must be presented within one week of when the item was returned. A grade of "I" will be given only in accordance with University policy. The last day to drop without a grade is **January 27, 2019**. The last day to drop with a grade of "W" is **March 24, 2019**.

## Course Policies

### Honor Code

It is expected that all work for this class (including homework and labs) is your own. The university policy for academic misconduct is as follows: Middle Tennessee State University takes a strong stance against academic misconduct. Academic Misconduct includes, but is not limited to, plagiarism, cheating, and fabrication.

Academic Misconduct: Plagiarism, cheating, fabrication, or facilitation of any such act. For purposes of this section, the following definitions apply:

1. Plagiarism: The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper acknowledgment.
2. Cheating: Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term academic exercise includes all forms of work submitted for credit or hours.
3. Fabrication: Unauthorized falsification or invention of any information or citation in an academic exercise.
4. Facilitation: Intentionally or knowingly helping or attempting to help another to violate a provision of the institutional code of academic misconduct.

To be clear, going online and using information without proper citations, copying parts of other student's work, creating information for the purposes of making your paper seem more official, or anything involving taking someone else's work without proper attribution is academic misconduct. If you work together with other students on an assignment when it is not allowed, it is academic misconduct. All cases of academic misconduct will result in a minimum penalty of zero credit for the associated assignment. They may also result in failure in the course. For more information, please refer to the following links:

[Computer Science Department Policy on Academic Integrity](#)

[MTSU's Academic Integrity and Misconduct Policy](#)

### Financial Aid Notice

Students receiving any form of financial aid should always consult the Financial Aid Office before dropping a course. For additional information, contact the Financial Aid Office (898-2830) or see <http://www.mtsu.edu/financialaid>.

### Lottery Scholarship Information

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you may not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

The MT One Stop is located in Room 210 of the Student Services & Admissions Center (SSAC). If you have additional questions about financial aid, registration, tuition and billing and transcripts, please contact your [MT One Stop Enrollment Counselor](#) or come by the MT One Stop.

### Reporting of Unofficial Withdrawals

Federal regulations require that students who cease class attendance but do not officially withdraw from the University must be reported so that future financial aid will cease and/or the student will be required to return funds. Therefore, during the term I will be required to complete a roster indicating those students who have stopped attending class without officially withdrawing. Faculty members are not required to check attendance each day; however, I may use project submission deadlines, quizzes, advising appointments, or other methods I choose to determine unofficial withdrawals.

### Reasonable Accommodation for Students with Disabilities

If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please contact the Disability & Access Center (DAC) as soon as possible. The DAC is located in Keathley University Center (KUC), room 121. Office phone: 898-2783 or Email: [dacmail@mtsu.edu](mailto:dacemail@mtsu.edu).

### Title IX Information and Resources

MTSU faculty are concerned about the well-being and development of our students and are legally obligated to share reports of sexual assault, dating violence, domestic violence and stalking with the University's Title IX coordinator to help ensure student's safety and welfare. Please refer to MTSU's Title IX site for contact information and details: <http://www.mtsu.edu/titleix/>

### Accreditation Activities

Samples of graded work will be collected this semester for our accreditation team. Identifying information will be removed from any such work collected.

[Joshua L. Phillips](#)  
[MTSU | CS | Home Page](#)

Copyright © MTSU  
Last Modified: **January 14 2019 12:33:41**





JONES COLLEGE OF BUSINESS  
Department of Economics and Finance  
**Course Syllabus**

---

### ECON 2410 Section 1 Principles of Macroeconomics

**Instructor:** David A. Penn

**Class Times/Location:** 2:20-3:45pm MW MCWHERTER LEARNING RESOURCES C 221

**Office and Hours:** BAS N316 1:00-2:15pm MW, 10:30am-12:00noon Tuesday, and by appointment.

**Email:** david.penn@mtsu.edu

**Text material:** material on Desire to Learn (<https://elearn.mtsu.edu/d2l/le/content/7443162/Home>)

**Learning Management System:** Top Hat ([www.tophat.com](http://www.tophat.com)) Join code 189581

---

**Course Description and Learning Outcomes:**

Unemployment, inflation, economic growth, and the business cycle are issues that affect us all. Our goal is to learn enough about the framework of economics so that five years from now you will still recall and understand the important relationships.

In this course we will learn about 1) how markets work, 2) the major components of the economy, 3) the causes of economic growth, 4) the role of money and financial institutions, 5) the causes of short-term economic fluctuations and their solutions, and 6) the importance of trade and capital flows. All these topics will help us learn about how economics touches our work, our lives, and how we think about the world we live in.

**Attendance:**

Attendance is expected at all classes and will count 2 points each class. Recognizing that illness and unforeseen events inevitably occur, two absences will be allowed without loss of attendance points.

Attendance will be recorded using Top Hat during each class. **YOU MUST REGISTER WITH THIS COURSE ON [WWW.TOPHAT.COM](http://WWW.TOPHAT.COM) NOT LATER THAN THE BEGINNING OF THE SECOND CLASS, MAKING SURE TO PROVIDE YOUR FIRST AND LAST NAMES.** The fee is paid by the Jones College of Business, so you do not pay for this service. Students who do not register on Top Hat or record attendance on Top Hat or do not provide their names when registering on Top Hat will be considered absent. Students are expected to know about quizzes, assignments, and exams regardless of attendance.

**Course Grading:**

Your grade is determined by your performance as detailed below. Please DO NOT ask for special consideration, as no deviations will be allowed. Your progress will be measured by attendance, exams, Top Hat quizzes, and in-class assignments. Three exams will be offered including the final exam. The final exam will NOT be comprehensive. Final grades will depend on points earned on the three exams, Top Hat quizzes, in-class quizzes, and attendance. Exams will include material presented during lectures and provided on D2L. Points and final grades will be determined as follows:

Item		Points	Percent of Total Points	Grade
Attendance	2 points each class	54	90% or more	A
Top Hat quizzes	3 points each class	75	80%-89.9%	B
D2L quizzes	5 points each chapter	125	70%-79.9%	C
In-class assignments (12)	10 points each	120	60%-69.9%	D
Exams (3)	100 points each	300	Less than 60%	F
<b>TOTAL POINTS</b>		<b>674</b>		

Be sure to attend all three exams, as all are required. Do not assume that I will reschedule an exam for you to accommodate your particular circumstances. In the very rare event that you are too ill to attend an exam, you are required to contact me immediately by email; failure to do so will result in a zero for the exam. A makeup of an exam or assignment is allowed only if the absence is VERIFIED BY DOCUMENTATION.

Plus-minus grading will NOT be used in this course. Please visit with me as soon as possible if you have special circumstances and need help with the material or taking exams.

If you make an appointment to see me outside office hours, please keep your appointments. A 5 point penalty will be assessed for appointments scheduled but missed.

### **Course Topics**

#### ***Introduction to economics***

1. What is economics?
2. Economic models – production possibilities, circular flow, and gains from trade
3. Supply and demand

#### ***Introduction to macroeconomics***

4. Tracking the economy - GDP
5. Tracking the economy - Unemployment and inflation

#### ***Long-term issues***

6. Economic growth
7. The financial system, saving, and investment

#### ***Explaining short-term economic fluctuations***

8. Consumption and the multiplier
9. Aggregate demand and aggregate supply

#### ***Macroeconomic policy***

10. Money and banking
11. Monetary policy
12. Fiscal policy

#### ***International issues***

13. Imports, exports, tariffs, and quotas
14. Exchange rates and the balance of payments
15. Exchange rate regimes, devaluation, and revaluation

#### ***Inflation and unemployment***

16. Phillips curve and policy

### **MARK THESE DATES ON YOUR CALENDAR NOW**

EXAM 1 Wednesday February 13

EXAM 2 Wednesday March 20

**FINAL EXAM Wednesday May 1 12:30pm-2:30pm**

### **Mission of the Jones College of Business:**

The mission of the Jones College of Business is to:

- Foster student success in a large business school with a small school feeling created by caring, professional faculty and staff interacting with students as individuals, in small classes, through proactive student organizations, and in a broad range of other settings, with students' needs constantly of prime consideration;
- Provide career opportunities to our students by capitalizing on our extensive alumni network—82 percent of Jones College graduates live and work in Middle Tennessee; and
- Cultivate an international perspective among students that enables them to contribute to and succeed in the global marketplace.

We will produce graduates from our bachelor, master, doctoral, and executive and continuing education programs who are prepared for challenges and advancements in their chosen careers.

#### **Hope (Lottery) Scholarship Information:**

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility. Dropping or stopping attendance in a class may also impact eligibility; if you withdraw from or stop attending this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until reaching 120 TELS attempted hours or earning a bachelor degree. For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) HYPERLINK "http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf" or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>)

#### **Reasonable Accommodations for Students with Disabilities:**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website [www.mtsu.edu/dac](http://www.mtsu.edu/dac) HYPERLINK "http://www.mtsu.edu/dac" and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). ADA accommodation requests (temporary or permanent) are determined only by the DAC. Students are responsible for contacting the DAC to obtain ADA accommodations and for providing the instructor with the Accommodation Letter from the DAC.

#### **Academic Conduct:**

Middle Tennessee State University takes a strong stance against academic misconduct. Academic misconduct includes, but is not limited to, plagiarism, cheating, and fabrication.

- Plagiarism. The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper attribution. This includes self-plagiarism, which occurs when an author submits material or research from a previous academic exercise to satisfy the requirements of another exercise and uses it without proper citation of its reuse.
- Cheating. Using or attempting to use unauthorized materials, information, or aids in any academic exercise or test/examination.
- Fabrication. Unauthorized falsification or invention of any information or citation in an academic exercise.

Students guilty of academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class. In these instances, the faculty member has the authority to assign an appropriate grade for the exercise or examination, or to assign an F in the course, as is proportional to the nature and extent of academic misconduct.

---



## JONES COLLEGE OF BUSINESS

### Course Syllabus

---

#### Economics 2420: Principles of Microeconomics Fall 2018 – 3 Credits

**Instructor:**

Aaron Gumno  
Office Hours: W: 12:00 – 5:00 pm and by appointment  
BAS N306  
[Aaron.gamino@mtsu.edu](mailto:Aaron.gamino@mtsu.edu)  
**DO NOT EMAIL THE D2L ADDRESS**

**Teaching Assistants:**

Sanjin Mehic  
[Sm6q@mtmail.mtsu.edu](mailto:Sm6q@mtmail.mtsu.edu)

Vedran Vujic  
[Vv2d@mtmail.mtsu.edu](mailto:Vv2d@mtmail.mtsu.edu)

Office Hours: T: 12:00-1:00, 3:00-5:00  
R: 12:00-1:00, 2:30-6:30

At the Tutoring Center in Walker Library

**Class Times/Location:**

TR: 1:00 pm – 2:25 pm, McWherter 221

**Textbook:**

No textbook is required for this course. However, a textbook may be beneficial in providing additional examples and material to study. For these purposes almost any introductory microeconomics textbook will suffice (used/old editions are around \$30 or less).

**Additional materials:**

You will need to bring wifi-capable device that is compatible with D2L to class. This can be your phone, laptop, tablet, etc. This will be used for attendance and in class participation.

---

**Mission of the Jones College of Business:**

The mission of the Jones College of Business is to:

- Foster student success in a large business school with a small school feeling created by caring, professional faculty and staff interacting with students as individuals, in small classes, through proactive student organizations, and in a broad range of other settings, with students' needs constantly of prime consideration;
- Provide career opportunities to our students by capitalizing on our extensive alumni network—82 percent of Jones College graduates live and work in Middle Tennessee; and
- Cultivate an international perspective among students that enables them to contribute to and succeed in the global marketplace.

We will produce graduates from our bachelor, master, doctoral, and executive and continuing education programs who are prepared for challenges and advancements in their chosen careers.

#### **Hope (Lottery) Scholarship Information:**

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility. Dropping or stopping attendance in a class may also impact eligibility; if you withdraw from or stop attending this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until reaching 120 TELS attempted hours or earning a bachelor degree. For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

#### **Reasonable Accommodations for Students with Disabilities:**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website [www.mtsu.edu/dac](http://www.mtsu.edu/dac) and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). ADA accommodation requests (temporary or permanent) are determined only by the DAC. Students are responsible for contacting the DAC to obtain ADA accommodations and for providing the instructor with the Accommodation Letter from the DAC.

#### **Course Description and Learning Outcomes:**

The aim of this course is to introduce students to basic economic concepts and tools with a focus on individuals and firms. The course will provide some framework to understand how agents make decisions when faced with limited resources. For topics covered see the course schedule below.

#### **Course Materials:**

Attendance, homework and quizzes will be administered using D2L.

In addition to the course materials tutoring is available for this course. The central location for tutoring is the Tutoring Spot, located in the Walker Library. For more information visit <http://mtsu.edu/studentsuccess/tutoring.php#on>.

#### **Course Grading:**

Course grades will be composed of the following:

**Exams (45%):** There are four exams, each covering four to five chapters, but only your top three scores will count toward your grade. Each exam will consist of multiple-choice questions and short answers.

**Homework (25%):** There will be a homework assignment on D2L associated with each lecture covering new material. Each homework you will have 2 attempts with the average score being counted. The lowest 3 scores will be dropped.

**Quizzes (25%):** There will be a quiz almost every week due Friday by 11:59 PM. The quiz will be available after class on Thursdays. Each quiz will consist of multiple-choice questions and one short answer. Sample answers to the short answer will be made available as a tool to help study for the exams. The lowest 3 scores will be dropped.

**In class participation (5%):** In class participating via clicker of the questions will be graded equal parts completion and correctness.

***If there are any scheduled conflicts with exam dates you must let me know before the first exam. There will only be make up exams offered for unexpected conflicts with proper documentation of the conflict. There will be no make up homework or quizzes.***

Final grades will be based on the plus/minus system: A = 4.0; B+ = 3.33; B = 3.0; B- = 2.67; C+ = 2.33; C = 2.0; C- = 1.67; D+ = 1.33; D = 1.0; D- = 0.67; F = 0.0

#### **Attendance:**

Attendance is not mandatory but is recommended to receive credit for in class participation/attendace. Time is a scarce resource so use yours wisely. I will be providing explanations and examples beyond those in the textbook. Exam questions may be drawn from material covered in class which may not be covered in the textbook or homework.

#### **Academic Conduct:**

Middle Tennessee State University takes a strong stance against academic misconduct. Academic misconduct includes, but is not limited to, plagiarism, cheating, and fabrication.

1. Plagiarism. The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper attribution. This includes self-plagiarism, which occurs when an author submits material or research from a previous academic exercise to satisfy the requirements of another exercise and uses it without proper citation of its reuse.
2. Cheating. Using or attempting to use unauthorized materials, information, or aids in any academic exercise or test/examination.
3. Fabrication. Unauthorized falsification or invention of any information or citation in an academic exercise.

Students guilty of academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class. In these instances, the faculty member has the authority to assign an appropriate grade for the exercise or examination, or to assign an F in the course, as is proportional to the nature and extent of academic misconduct.

#### **Professionalism:**

The Jones College of Business is a professional school. In the Jones College of Business, students will demonstrate Professionalism, which includes these behaviors:

- A solid work ethic demonstrated by preparation, punctuality, participation, and productivity;
- Respectful and courteous interaction with others;
- Ethical conduct; and
- Professional deportment highlighted by business-appropriate dress, diction, and

demeanor.

As a Jones College student, part of your preparation for your future career includes the ability to adapt to the expectations of your supervisors and to manage your own expectations relative to your position within the organization. The faculty in the Jones College expect that you will take this aspect of your preparation seriously.

---

### **Course Schedule:**

Week 1

1/15– Introduction  
1/17– Economic Models

**1/18 11:59PM – Homework due**

Week 2

**1/21 11:59PM – Week 1 quiz due**

1/22 – Economic measures  
1/24 – Supply and Demand

**1/25 11:59PM – Homework due**

Week 3

**1/28 11:59PM – Week 2 quiz due**

1/29 – Review  
1/31 – Exam 1 (Covers lectures to this point)

Week 4

2/5 – Extensions of Supply and Demand  
2/7 – Understanding Demand

**2/8 11:59PM – Homework due**

Week 5

**2/11 11:59PM – Week 4 quiz due**

2/12 – Understanding Supply  
2/14 – Long Run

**2/15 11:59PM – Homework due**

Week 6

**2/18 11:59PM – Week 5 quiz due**

2/19 – Review  
2/21 – Exam 2 (Non-cumulative)

Week 7

2/26 – Perfect Competition  
2/28 – Monopoly

**2/29 – Homework due**

Week 8

**3/11 11:59PM – Week 7 quiz due**

3/12 – Monopolistic Competition  
3/14 – Oligopoly

**3/15 11:59PM – Homework due**

Week 9

**3/18 11:59 PM – Week 8 quiz due**

3/19 – Regulating Firms  
3/21 – Government

**3/22 11:59PM – Homework due**

Week 10

**3/25 11:59PM – Week 9 quiz due**

3/26 – Review  
3/28 – Exam 3 (non-cumulative)

Week 11

4/2 – Labor markets  
4/4 – Taxes

**4/5 11:59PM – Homework due**

Week 12

**4/8 11:59PM – Week 11 quiz due**

4/9 – Trade  
4/11 – Financial Markets

**4/12 11:59PM – Homework due**

Week 13

**4/15 11:59PM – Week 12 quiz due**

4/16 – Healthcare  
4/18 – Review

**4/17 11:59PM – Homework due**

Week 14

**4/22 11:59PM – Week 13 quiz due**

4/23 – Exam 4 (non-cumulative)



## JONES COLLEGE OF BUSINESS

### Course Syllabus

---

#### ECON 4620 – 5620 Econometrics and Forecasting

**Instructor:** Chris Klein

**Class Times/Location:** 1:00 – 2:25 p.m., BAS S302

**Office and Hours:** BAS N 303, TR 11:00a.m.-12:00 Noon and 4:00-5:00 p.m.; F 10:00 a.m. – 12:00 Noon; and by appointment

**Phone:** 615-904-8570

**Email:** chris.klein@mtsu.edu

**Textbook:** *Essentials of Econometrics*, 4th Ed., by Damodar N. Gujarati and Dawn C. Porter, published by McGraw-Hill/Irwin, 2009. (You can get by with the 3<sup>rd</sup> Ed.)

Additional materials (PowerPoint slides, homework, review materials, etc.) are on D2L.

---

#### Mission of the Jones College of Business:

The mission of the Jones College of Business is to:

- Foster student success in a large business school with a small school feeling created by caring, professional faculty and staff interacting with students as individuals, in small classes, through proactive student organizations, and in a broad range of other settings, with students' needs constantly of prime consideration;
- Provide career opportunities to our students by capitalizing on our extensive alumni network—82 percent of Jones College graduates live and work in Middle Tennessee; and
- Cultivate an international perspective among students that enables them to contribute to and succeed in the global marketplace.

We will produce graduates from our bachelor, master, doctoral, and executive and continuing education programs who are prepared for challenges and advancements in their chosen careers.

#### Hope (Lottery) Scholarship Information:

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75

cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility. Dropping or stopping attendance in a class may also impact eligibility; if you withdraw from or stop attending this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

### **Reasonable Accommodations for Students with Disabilities:**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website [www.mtsu.edu/dac](http://www.mtsu.edu/dac) and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). ADA accommodation requests (temporary or permanent) are determined only by the DAC. Students are responsible for contacting the DAC to obtain ADA accommodations and for providing the instructor with the Accommodation Letter from the DAC.

### **Course Description and Learning Outcomes:**

Econometrics is literally economic measurement, but that definition is misleading. It is more accurate to say that econometrics is the application of mathematical and statistical techniques to economic data for the purpose of testing hypotheses from economic theory. Ideally, any econometric study proceeds in these steps:

1. State a theory or hypothesis to be tested.
2. Collect data.
3. Specify the mathematical model of the theory.
4. Specify the statistical or econometric model for the theory.
5. Estimate the parameters of the econometric model.
6. Check the model specification for adequacy or performance.
7. Test hypotheses derived from the model.
8. Use the model for prediction or forecasting.

By the end of this course students should be able to perform a simple econometric study embodying all of these steps and to write a research paper based on the study.

### **Course Grading:**

The course grade is determined by a combination of exams, problem assignments, and writing assignments, culminating in a research paper. Two midterm exams make up 40% of the final grade. You may use the textbook and your notes during the exams. Problem sets (homework) will make up 20% of the final grade. Writing assignments documenting a research project in the form of an econometric study developed and executed by each student will account for the remaining 40% of the final grade.

Problems Sets	20%
Exam 1	20%
Exam 2	20%
Writing Assignments	20%
Research Paper	<u>20%</u>
Total	100%

The course grade scale is A > 90%; 90% > B  $\geq$  80%; 80% > C  $\geq$  70%; 70% > D  $\geq$  60%; 60% > F. The instructor may assign plus and minus grades at his discretion.

The exam dates are shown on the attached class schedule. Homework and writing assignment due dates are indicated also. There is no final exam. The research paper is due on the final exam date.

Students should begin work on their projects as soon as possible. Each student must hand in a research proposal no later than the fourth week of the semester. If students encounter any problems with their projects they should notify the instructor immediately so that alternatives may be developed for completion during the course of the semester. The following writing assignments are due as the project progresses as shown on the attached schedule. Students must submit hard (printed) copies of each of the first six writing assignments, but datasets and the final paper must be submitted in electronic form.

W1: Research Proposal – state the research question, a preliminary regression equation, and the economic rationale for them.

W2: Literature Review – review recent research articles (3 minimum) relevant to the research question and include a bibliography or list of references.

W3: Data Sources – describe the variables to be collected and their sources.

W4: Data Description – describe the scope of the dataset, define the variables, and present simple statistics (mean, standard deviation, minimum, maximum) in tabular form.

W5: Estimation Strategy - write down the econometric model and discuss the expected signs of the coefficients based on economic intuition.

W6: Results - presentation and discussion of results and conclusions (may be included in a preliminary draft of the complete research paper).

W7: Final Paper

This course will require students to use econometric software for personal computers in order to perform the required regressions and hypothesis testing. All of the work for this course can be accomplished in EXCEL, but students in ECON 4620 are encouraged to use the statistical package “R”. Students in ECON 5620 are required to use R. R can be downloaded for free from the sites listed at [cran.r-project.org/](http://cran.r-project.org/) (click on “Mirrors”). Instructions on using R will be provided later in the course. Although students may use other statistical packages if they choose (such as SAS, SPSS, TSP, and STATA), this course does not address the use of additional software in any detail and the instructor will not provide support for alternative packages.

#### **Attendance:**

Attendance in class is expected. An excessive number of absences will seriously

affect students' ability to do well in the course. The course instructor has the sole prerogative to excuse or refuse to excuse student absences. Students will not be penalized for absences related to their participation in University sanctioned activities or in situations where the institution's policy on inclement weather is applicable. The University also considers participation in military duties as an excused absence. Non-attendance in class does not relieve a student of the responsibility for work covered or assigned in his/her absence.

**Academic Conduct:**

Middle Tennessee State University takes a strong stance against academic misconduct. Academic misconduct includes, but is not limited to, plagiarism, cheating, and fabrication.

1. Plagiarism. The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper attribution. This includes self-plagiarism, which occurs when an author submits material or research from a previous academic exercise to satisfy the requirements of another exercise and uses it without proper citation of its reuse.
2. Cheating. Using or attempting to use unauthorized materials, information, or aids in any academic exercise or test/examination.
3. Fabrication. Unauthorized falsification or invention of any information or citation in an academic exercise.

Students guilty of academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class. In these instances, the faculty member has the authority to assign an appropriate grade for the exercise or examination, or to assign an F in the course, as is proportional to the nature and extent of academic misconduct.

---

**Course Schedule: Begins on the next page.**

## Class Schedule

- Jan. 15 T Introduction, Ch. 1  
17 R Writing a Research Paper
- 22 T Probability and Statistics, Appendix A (Ch. 2, 3<sup>rd</sup> ed.)  
24 R Probability, continued.
- 29 T Probability Distribution Characteristics, Appendix B (Ch. 3)  
31 R Characteristics, continued. **Homework 1 Due**
- Feb. 5 T Some Useful Probability Distributions, Appendix C (Ch. 4)  
7 R Distributions, continued. **Homework 2 Due**  
**W1: Research Proposal Due**
- 12 T Estimation and Hypothesis Testing, Appendix D (Ch. 5)  
14 R Estimation and Testing, continued. **Homework 3 Due**
- 19 T Review for Exam 1; **Homework 4 Due**  
21 R **Exam 1:** Appendices A – D (Ch. 2-5)
- 26 T Linear Regression, Ch. 2 (Ch. 6)  
28 R Regression, continued. **W2: Literature Review Due**
- March 4-8 **Spring Break**
- 12 T Two Variable Models, Ch.3 (Ch.7) **Homework 5 Due**  
14 R Multiple Regression, Ch. 4 (Ch. 8);
- 19 T Dummy Variables, Ch. 6 (Ch. 10); **W3: Data Sources Due**  
21 R Project Workshop; **Datasets Due**
- 26 T Functional Forms, Ch. 5 (Ch. 9) **Homework 6 Due**  
28 R Review for Exam 2; **W4: Data Description Due**
- April 2 T **Exam 2:** Chapters 2-6 (Ch. 6-10)  
4 R Multicollinearity, Heteroscedasticity, & Autocorrelation Ch. 8-10 (12-14)
- 9 T Project Workshop; **W5: Estimation Strategy Due**  
11 R Project Workshop;
- 16 T Project Workshop; **Homework 7 Due**  
18 R Project Workshop; **W6: Results Due**
- 23 T Project Workshop
- May 2 R Final Paper Due 3:00 p.m.**



## JONES COLLEGE OF BUSINESS

### Course Syllabus

---

#### INFS 3470 – Python for Business Applications

**Instructor:** Michael Murphy

**Office Location:** N335, BAS building 3<sup>rd</sup> Floor

**Office Hours:** (Spring) Monday 2:30pm - 4:30pm; Tuesday, Thursday 2:30pm - 4pm

**Email:** [Michael.Murphy@mtsu.edu](mailto:Michael.Murphy@mtsu.edu) (Please do not use D2L email)

**Textbook:** **Learn Python in One Day and Learn it Well (2nd Edition)** by Jamie Chan.

**ISBN-13:** 978-1546488330

---

#### **Mission of the Jones College of Business:**

The mission of the Jones College of Business is to:

- Foster student success in a large business school with a small school feeling created by caring, professional faculty and staff interacting with students as individuals, in small classes, through proactive student organizations, and in a broad range of other settings, with students' needs constantly of prime consideration;
- Provide career opportunities to our students by capitalizing on our extensive alumni network—82 percent of Jones College graduates live and work in Middle Tennessee; and
- Cultivate an international perspective among students that enables them to contribute to and succeed in the global marketplace.

We will produce graduates from our bachelor, master, doctoral, and executive and continuing education programs who are prepared for challenges and advancements in their chosen careers.

#### **Hope (Lottery) Scholarship Information:**

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility. Dropping or stopping attendance in a class may also impact eligibility; if you withdraw from or stop attending this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until reaching 120 TELS attempted hours or earning a bachelor degree. For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

**Reasonable Accommodations for Students with Disabilities:**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website [www.mtsu.edu/dac](http://www.mtsu.edu/dac) and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). ADA accommodation requests (temporary or permanent) are determined only by the DAC. Students are responsible for contacting the DAC to obtain ADA accommodations and for providing the instructor with the Accommodation Letter from the DAC.

**ISA Department:**

The Department of Information Systems and Analytics is focused on guiding our students to succeed at MTSU and to move into rewarding careers in the field of information systems. As part of our undergraduate program, all students are required to take a number of courses, some of which require a specific sequence. Please note that INFS 4950 requires three prerequisites: INFS 2400, INFS 3400, and INFS 3800. Additionally, prior to taking INFS 3400, all students must complete INFS 2600. Additional information about the degree program and course requirements can be found at <https://www.mtsu.edu/isa/>. To keep up-to-date with important information from the department (news, announcements, etc.), please visit our Facebook page at <https://www.facebook.com/ISAatMTSU/>.

**Course Description and Learning Outcomes:**

This course introduces Python, a popular, general purpose programming and scripting language well suited to a wide range of business problems. Topics include basics of programming-variables, strings, lists, functions, writing scripts that automate tedious tasks, parsing and interpreting data, interacting with APIs, and building web scrapers. Emphasis on practical applications in a business context.

The major objectives of this course include:

1. Be able to write Python scripts to solve common real-world tasks.
2. Be able to use Python modules.
3. Be able to analyze and visualize data from files and web pages using Python.

**Required Software:** We will be using the Python 3 language for this course, along with several popular Python modules. The Anaconda distribution is a convenient package which includes all required modules for this course (<https://www.anaconda.com/download/>). We will be using Jupyter Notebook (included in the Anaconda distribution) for our in-class work and assignments.

**Jump Drive:** Lab computers are not guaranteed to save your work. Although not required, it is recommended that you have a flash drive to save all your work. Dropbox, SkyDrive, and Google Drive are some cloud based services that you can use to backup and save all your work.

**Attendance:**

Students are expected to attend all classes. If a student misses a class, it is their responsibility to ascertain what material was missed and if it is possible to make-up the missed material. If a student must miss a class, they should **email the professor prior to the missed class day** for make-up procedures. If a student misses a class due to illness / accident, a signed doctor's note will be required to be eligible to make up late assignments.

Please come to class on time!

**Course Workload:**

The workload for this class will primarily be in the form of Python programming assignments, along with two programming / reporting projects.

**Programming Assignments (PA):** Programming Assignments are take-home exercises in Python. They may range from creating short Python scripts that solve a task, or larger programs.

**In-Class Exercises (CE):** In-Class Exercises are programming exercises that are to be completed in the classroom. These exercises will allow students to work through questions with the instructor and other students.

**Pop Quizzes (QUIZ):** Quizzes may be announced or unannounced, and can take any form (programming exercise, multiple choice, true/false, short answer, etc.)

**Midterm Project / Final Project:** There will be two main projects in this course. These projects will be Jupyter Notebook projects that consist of working Python code examples and a formal written report.

**Course Grading:**

Programming Assignments, In-Class Exercises, Quizzes ~ 50%	90% and above	A
Midterm project: ~ 20 %	80%-89.99%	B
Final project: ~ 30%	70%-79.99%	C
	60%-69.99%	D
	59.99% and below	F

Grading for this course is points-based. Your final grade percentage will be determined by total points earned divided by total possible points.

**Assignment Submissions and Deadlines:**

Most programming assignments in this course will be completed in Jupyter Notebook. To successfully submit an assignment, the student will:

- Zip the .ipynb file(s) and associated files
- Submit the zipped file to the appropriate D2L assignment dropbox folder
- Submit the assignment by the dropbox deadline. You may submit as many times as you like, as only the final submission will be graded.

The D2L system will handle late submissions. Once a dropbox deadline has expired, any student who has not submitted work will receive a grade of 0 for that assignment.

**Late Submissions:**

**I do not accept late submissions.** Please turn your work in on time! A partially completed project is much better than no project. Submit your work early and often -- there is no penalty for multiple submissions. Only your final submission will be graded.

**Incomplete file submissions:**

It is the students' responsibility to submit the appropriate files to the appropriate dropbox. Please check your submissions to avoid receiving a 0 on an assignment due to submission error.

## **Academic Misconduct and Academic Integrity**

Middle Tennessee State University takes a strong stance against academic misconduct. Academic misconduct includes, but is not limited to, plagiarism, cheating, and fabrication.

1. Plagiarism. The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper attribution. This includes self-plagiarism, which occurs when an author submits material or research from a previous academic exercise to satisfy the requirements of another exercise and uses it without proper citation of its reuse.
2. Cheating. Using or attempting to use unauthorized materials, information, or aids in any academic exercise or test/examination.
3. Fabrication. Unauthorized falsification or invention of any information or citation in an academic exercise.

Students guilty of academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class. In these instances, the faculty member has the authority to assign an appropriate grade for the exercise or examination, or to assign an F in the course, as is proportional to the nature and extent of academic misconduct.

A new system is now being used to track cases of Academic Integrity issues and facilitate communication with students. An example of the email sent to a student with a registered case is shown below:

THIS IS AN OFFICIAL CORRESPONDENCE FROM THE DIRECTOR OF ACADEMIC INTEGRITY AT MIDDLE TENNESSEE STATE UNIVERSITY

A letter has been issued to you electronically by our office. Upon clicking the link below, you will be taken to a screen requesting you log in with your campus username and password to securely access this correspondence. If you are receiving this notice in your capacity as a leader of a campus organization, you should contact our office immediately to request the appropriate access code for your organization.

Your letter will appear in PDF format and should be printed or saved for your records. If the letter fails to appear, you may need to use a different computer or install the free Adobe Acrobat Reader. If you continue to experience difficulty accessing your letter or wish to confirm the legitimacy of this message, please contact our office at 615-898-2533.

[Pick up your letter](#)

Copying code and/or answers from another student is considered academic misconduct, and **any assignment that shows evidence of student shared code will result in a grade of '0' for all parties involved**, as well as **a loss of one letter grade (-10%) from the final course average**.

Examples of acceptable coding practice:

- Google examples of correct syntax/module usage (Stack-Overflow / tutorial videos / etc.)
- Discussing with other students strategies to attack a programming problem, as long as no assignment code is present.
- Discussing your work with a professor / tutor

Examples of academic misconduct:

- Directly copying code from the internet without citing your source.
- Showing another student your code to illustrate how you solved a problem.
- Asking another student to look over or debug your solution
- Having someone else write your code

## **Class Announcements**

Class announcements, such as assignment deadline adjustments, will be posted on the course D2L home page. Students can opt-in to receive email alerts whenever a new news item is posted. It is the student's responsibility to keep up with course announcements by coming to class and visiting the D2L course page.

---

## **Frequently Asked Questions (FAQ):**

**Q:** I tried to submit my homework a minute before the D2L deadline but the assignment said the dropbox was closed. Can I email you my assignment or will you extend the dropbox deadline?

**A:** No. The D2L deadline is the final deadline. Do not wait until the last minute to submit!

**Q:** I submitted a wrong assignment / incomplete assignment / partial files... can I email you the correct assignment?

**A:** No. I will only accept assignments submitted to the appropriate D2L dropbox by the D2L deadline. It is the student's responsibility to check that proper and complete assignments are submitted on time.

## **SPRING 2019 – University Calendar**

**January 14** - Classes begin

**January 20** - Last day to Add/Late Register on PipelineMT.

**January 20** - Registered student Fee Payment deadline. Class schedules will be deleted unless fees paid or attendance confirmed with financial aid.

**January 27** - Deadline for students to drop a course without a grade.

**January 28 - March 24** - Students who drop a course receive automatic grade of "W".

**March 4–9** - Spring Break – no classes.

**April 1–12** - Priority registration for Summer and Fall 2019.

**April 24** - Last day to withdraw from the University (all classes) and receive "W" or "F" as determined by the instructor.

**April 24** - Last day of classes.

**April 25** - Study Day (no classes/exams/mandatory meetings may be scheduled).

**April 26 – May 2** - Final exams.



## JONES COLLEGE OF BUSINESS

### Course Syllabus

---

#### INFS 4790 Database Design and Development

**Instructor:** Dr. S. Morris

**Class Times/Location:** Monday & Wednesday, 12:40 – 2:05pm, BAS S315

**Office Number:** BAS N344

**Office Hours:** Monday & Wednesday, 10:30pm – 12:30pm  
Wednesday, 5pm – 6pm

**Phone:** 904-8172

**Email:** steven.morris@mtsu.edu

**Textbook:** *Database Systems: Design, Implementation, & Management, 13<sup>th</sup> edition.*  
By Coronel & Morris

**Software:** Lucid Chart ([www.lucidchart.com](http://www.lucidchart.com))  
Oracle client  
SQL Tools (v. 1.6+ recommended)

---

#### Mission of the Jones College of Business:

The mission of the Jones College of Business is to:

- Foster student success in a large business school with a small school feeling created by caring, professional faculty and staff interacting with students as individuals, in small classes, through proactive student organizations, and in a broad range of other settings, with students' needs constantly of prime consideration;
- Provide career opportunities to our students by capitalizing on our extensive alumni network—82 percent of Jones College graduates live and work in Middle Tennessee; and
- Cultivate an international perspective among students that enables them to contribute to and succeed in the global marketplace.

We will produce graduates from our bachelor, master, doctoral, and executive and continuing education programs who are prepared for challenges and advancements in their chosen careers.

**Hope (Lottery) Scholarship Information:**

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility. Dropping or stopping attendance in a class may also impact eligibility; if you withdraw from or stop attending this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until reaching 120 TELS attempted hours or earning a bachelor degree. For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

**Reasonable Accommodations for Students with Disabilities:**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website [www.mtsu.edu/dac](http://www.mtsu.edu/dac) and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu). ADA accommodation requests (temporary or permanent) are determined only by the DAC. Students are responsible for contacting the DAC to obtain ADA accommodations and for providing the instructor with the Accommodation Letter from the DAC.

Note that DAC policy requires:

- If you plan on taking tests with DAC so you can receive appropriate accommodations, you MUST notify the instructor and schedule the test with **DAC at least 3 business days prior to the exam date (minimum 5 business days prior to final exams)**.
- All such exams MUST be on the same day / time as the in-class exam **unless pre-approved** by the instructor.

**Course Objectives:**

- 1) Students will be able to apply a standard data modeling technique to design an effective and efficient database structure.
- 2) Students will be able to use a standard data definition and manipulation language (SQL) within a given database design to address specific business needs.
- 3) Students will be able to use a procedural database language to control planned data redundancy and improve database programming efficiency.

**Grading Scale:** 900+      A,  
800 – 899    B,  
700 – 799    C,  
600 – 699    D,  
Below 600    F

**Graded Items:**

Take-home tests	400 (4 tests @100 points each)
Midterm	300
Final Exam	300

**Take-home tests:** There will be 4 take home tests worth a total of 400 points. All tests will be due at the beginning of the class on the due date. All tests are to be completed through **individual** effort. Any test not received at this time will receive a penalty of 5 points per day (weekends and holidays included). *Late tests will not be accepted for any credit after feedback on the test has been given in class or through D2L.*

**Take-home test schedule:**

Take home #1 (100 points) will be given at the conclusion of Chapter 3.

Take home #2 (100 points) will be given at the conclusion of Chapter 5.

Take home #3 (100 points) will be given at the conclusion of our coverage of SELECT.

Take home #4 (100 points) will be given at the conclusion of our coverage of Triggers.

**Midterm Exam:** The midterm exam will cover chapters 1 – 6 in the textbook. It will be a combination of multiple choice questions and data modeling problems.

**Final Exam:** The University scheduled date and time for this final exam is Monday, April 29th, 12:30 – 2:30pm. The final exam will consist of a combination of multiple choice questions and SQL & PL/SQL programming.

**Make-up Tests:** If you know ahead of time that you will be absent on the day of the exam, you may be able to arrange to take the exam early (providing the instructor one week notice, minimum, is required). *Late make-up tests will be given only for the most extreme situations and must be well-documented, excused absences.*

**Attendance:**

You are expected to attend all class meetings. If you miss a class, it is your responsibility to get whatever material was covered in class from a classmate. In accordance with University policy, any student missing one-half or more of the assigned class meetings will receive an “F” in the course, regardless of performance on graded assignments.

**Professionalism:**

*This is a job, treat it like one.*

Everything you turn in should be neat and professional in appearance

Meet deadlines

Complete all assigned tasks

*Class meetings are like business meetings.*

Come to every meeting prepared

Come on time

Don't use your cell phone during a meeting

If you have a laptop, keep your computer and your mind on the meeting

### **Academic Conduct:**

Middle Tennessee State University takes a strong stance against academic misconduct.

Academic misconduct includes, but is not limited to, plagiarism, cheating, and fabrication.

1. Plagiarism. The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper attribution. This includes self-plagiarism, which occurs when an author submits material or research from a previous academic exercise to satisfy the requirements of another exercise and uses it without proper citation of its reuse.
2. Cheating. Using or attempting to use unauthorized materials, information, or aids in any academic exercise or test/examination.
3. Fabrication. Unauthorized falsification or invention of any information or citation in an academic exercise.

Students guilty of academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class. All graded assignments in this class are to be completed *individually* – there are no graded group assignments. You are not to give or receive assistance on tests, quizzes, homework, or project assignments, in any form, from anyone, including other students, past or present. **All** violations of this policy will be reported to the Office of Academic Affairs, and will result in penalties including an automatic “F” in the course – if you cheat, you fail.

**Oracle Server:** All SQL and PL/SQL commands for the take home tests must be developed using your assigned user account on the *baseora* server using *SQL Tools* only.

**Required Software:** All of the required software of the course is available to you for free. A link to the website to download the software is provided in D2L in the “Content” section. The Oracle client and SQL Tools are available through this website. Lucid Chart is available online as a free service ([www.lucidchart.com](http://www.lucidchart.com)). Note that the Oracle software is only available in Windows. If you use a Mac, you will need to establish a Windows virtual machine, set up dual boot, or use a campus computer.

**Desire2Learn:** All PowerPoint slides used in class are available in Desire 2 Learn (D2L). **You** are responsible for ensuring that all of your submissions to D2L are actually completed. Once you think you have uploaded a submission in D2L, log out, log back on, and check your submission. Ensure that your submission is there in D2L and that the file actually contains the material that you intended it to contain.

### **ISA Department**

The Department of Information Systems and Analytics (formerly Computer Information Systems) is focused on guiding our students to succeed at MTSU and to move into rewarding careers in the field of information systems. As part of our undergraduate program, all students are required to take a number of courses, some of which require a specific sequence. Please note that INFS 4950 requires three pre-requisites: INFS 2400, INFS 3400, and INFS 3800. Additionally, prior to taking INFS 3400, all students must complete INFS 2600. Additional information about the degree program and course requirements can be found at [www.mtsu.edu/isa](http://www.mtsu.edu/isa). To keep up-to-date with important information from the department (news, announcements, etc.), please visit our Facebook page at [www.facebook.com/ISAatMTSU](http://www.facebook.com/ISAatMTSU) and follow us on Twitter at MTSU\_ISA.

## **INFS 4790/5790 approximate schedule**

Topic 1: Database concepts and data model alternatives (Ch. 1 & 2)

Topic 2: Relational model of databases (Ch. 3)

Topic 3: Entity relationship model (Ch. 4)

Topic 4: Data modeling of business requirements (Ch. 4)

Topic 5: Advanced data modeling (Ch. 5)

Topic 6: Normalization (Ch. 6)

Midterm

Topic 7: SQL (Ch. 7 & 8)

Topic 8: PL/SQL (Ch. 8)

Topic 9: Transaction Management and Concurrency Control (Ch. 10)

Final exam

---



Spring 2019  
INFS 4900/5900-001 – Business Data Communications  
Tuesday and Thursday from 1:00PM – 2:25PM  
BAS S272

## Instructor Information

**Name:** Dr. Ibtissam Zaza

**Office:** N348

**Email:** [Ibtissam.Zaza@mtsu.edu](mailto:Ibtissam.Zaza@mtsu.edu)

**Office Hours:** M 10:00-12:00, TR 9:30-11:00 and T 2:30 - 5:30 or by appointments (Office hours are a good time for you to ask questions and improve your understanding of what we do in class)

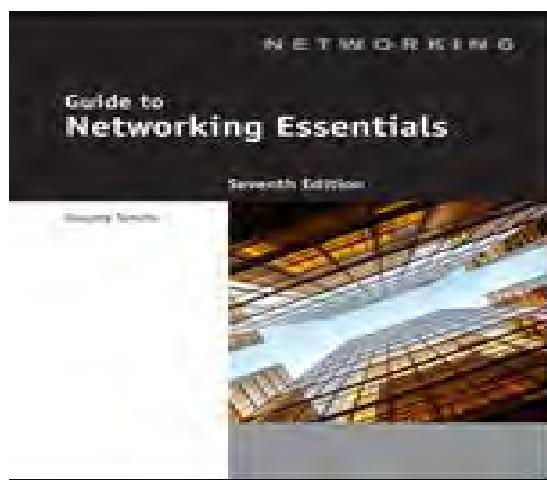
## Textbooks and Supplementary Materials

### Guide to Networking Essentials, 7th Edition

Greg Tomsho

ISBN-10: 1-305-10543-5

ISBN-13: 978-1-305-10543-0



## **Syllabus Change Policy**

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

## **Course Information**

### ***Course Description:***

This course will provide students with the knowledge about networking technologies and network operating systems from OSI model, routing, switching, IP addressing, to virtualization and cloud computing. In addition, this course offers hands-on skills necessary to work in a network environment.

### ***Course Objectives:***

After completing the course, students should be able to:

- Highlight the business importance of networks and telecommunications technologies
- Understand the basic operation of hubs, switches, access points, NIC, and routers
- The different types of hardware involved in designing, developing, and implementing network and telecommunications systems
- Discuss logical and physical topologies and the LAN technologies that use them
- Use WAN technologies to establish networks in addition to use remote access protocols in a cloud computing concepts
- Understand the different network topologies and when each can be implemented
- Levels of securing data and network

## **Assessment and Grading**

### ***Student Evaluation***

INFS 4900

Activities: 10%

Quizzes: 10%

Exam 1: 20%

Exam 2: 20%

Exam 3: 20%

Comprehensive Final Exam: 20%

INFS 5900

Activities: 5%

Quizzes: 5%

Project & Presentation: 10% (a separate handout will be provided)

Exam 1: 20%

Exam 2: 20%

Exam 3: 20%

Comprehensive Final Exam: 20%

### ***Grading Procedure:***

Below is the breakdown of points for the course.

### ***Grading Scale:***

A total of 100 points will be available to be earned on exams, assignments, and participation. Based on the points available, the following will be used in letter grade determination:

Points	Grade
90-100	A
87-89	B+
80-86	B
77-79	C+
70-76	C
67-69	D+
60-66	D
<60	F

All grade disputes must be brought to the attention of the professor within one week of receiving the grade. No changes to grades will be made after one week. All grade disputes must be submitted via e-mail. In order for your request to be considered, you must make an effort to sufficiently document the issue. Please note that there are no opportunities to gain additional points through extra credit work, etc. It is your responsibility to maintain your grade throughout the semester.

### ***Exams:***

Exam 1

Exam 2

Exam 3

Comprehensive Final Exam

***Makeup Exams:*** If you cannot make a scheduled exam time, you must schedule a make-up date with the instructor at least 1 week in advance. It also must be taken prior to the scheduled time

*for the entire class and you must have a valid excuse. ALL students must take the exams on campus at MTSU. Contact the instructor to receive permission and to setup a make up exam.*

## **Communication Guidelines**

- **Technical Support**

Students who experience problems logging into their course, timing out of their course, using the course web site tools or experience other technical problems, should be encouraged to contact the [MTSU Help Desk](#) online (24/7) or at 1-615/898-5345.

- **Students with Disabilities**

Reasonable Accommodations for Students with Disabilities: "ADA accommodation requests (temporary or permanent) are determined only by the [Office of Disabled Student Services \(DSS\)](#). Students are responsible for contacting the Disabled Student Services Office at 615-898-2783 to obtain ADA accommodations and for providing the instructor with the Accommodation Letter from Disabled Student Services".

- **Academic Misconduct**

The use of a third party to submit a student's work is only allowed when accommodations are approved by the Disabled Student Services Office. Students found to be in violation of this policy will be reported to the faculty member and Dean of Student Affairs.

Students should be familiar with the "[MTSU Students Rights and Responsibilities](#)" handbook which **outlines academic misconduct including plagiarism, cheating, fabricating or facilitating any such act**. The Handbook also **provides a statement of community standards of civil behavior and code of computer use**.

## **MATH 1530** **Course Syllabus**

**Course Title: Math 1530, Applied Statistics**

**Description:**

Applied Statistics. Three credits. This course satisfies the General Education Mathematics requirement and meets specific requirements for programs as outlined in the MTSU Undergraduate Catalog.

**Prerequisites:**

Two years of high school algebra and a Math Enhanced ACT score of 19 or greater or COMPASS placement.

**Semester, Section Number, and Classroom: Spring 2019, 002, KOM 323**

**Instructor: Lisa B. Green**

**Office: KOM 223D**

**E-mail: lisa.green@mtsu.edu**

**Phone: (615) 898-2669**

**Office Hours: 9-10 am MTWR**

**Webpage: D2L and PearsonMyLabAndMastering.com**

**Attendance:**

Attendance is required at each class meeting. Participation in University sanctioned activities or in military duties and situations where the institution's policy on inclement weather is applicable are considered excused absences. However, non-attendance does not relieve a student of the responsibility for work covered or assigned. The instructor will keep a record of attendance for each student.

**Required Text:**

*Fundamentals of Statistics*, 5<sup>th</sup> edition, by Michael Sullivan, III

MTStatPAL workbook

**Calculator:**

A TI-83 or TI-84 Plus graphing calculator is required for this course.

**Purpose:**

Applied Statistics explores descriptive statistics, probability, and statistical inference; including mean, proportion, and variance for one and two samples, and confidence intervals and hypothesis testing.

**Learning Outcomes:**

Upon completion of this course with a passing grade, the student will have

- Identified common misuses of statistics.
- Created appropriate graphs and used appropriate numeric values to summarize quantitative and qualitative data.
- Created a regression line.
- Interpreted the slope of a regression line and used a regression line to make predictions.
- Calculated the probability of simple events and calculated simple conditional probabilities.
- Found probabilities associated with the binomial and normal distributions.
- Explored the Central Limit Theorem's assumptions, conclusions, and consequences.
- Found and interpreted one-sample confidence intervals for population proportions.
- Found and interpreted one-sample confidence intervals for means.
- Found and interpreted two-sample confidence intervals for differences in proportions.
- Found and interpreted two-sample confidence intervals for differences in means.
- Explored how a confidence interval changes as the confidence level changes, as the sample size changes, as the sample standard deviation changes, and as the sample mean changes.
- Decided on appropriate null and alternate hypotheses in a hypothesis test.
- Performed one-sample hypothesis tests for population proportions.
- Performed one-sample hypothesis tests for population mean.
- Performed two-sample hypothesis tests for differences in population proportions.
- Performed two-sample hypothesis tests for differences in population means.
- Identified types of error in a hypothesis test.
- Explored the concept of a p-value.

## **General Education Mathematics Goal and Learning Outcomes:**

### **Goal:**

The goal of mathematics is to expand students' understanding of mathematics beyond the entry-level requirements for college and to extend their knowledge of mathematics through relevant mathematical modeling with applications, problem solving, critical thinking skills, and the use of appropriate technologies.

### **Learning Outcomes:**

Upon completion of this course, students will demonstrate the ability to:

- Use mathematics to solve problems and determine if the solutions are reasonable.
- Use mathematics to model real world behaviors and apply mathematical concepts to the solution of real-life problems.
- Make meaningful connections between mathematics and other disciplines.
- Use technology for mathematical reasoning and problem solving.
- Apply mathematical and/or basic statistical reasoning to analyze data and graphs.

### **Course Topics:**

This course consists of selected topics from Chapters 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11 in the required text, *Fundamentals of Statistics*, 5<sup>th</sup> edition, by Michael Sullivan, III, including collection, organization, and summarization of data; probability, discrete and normal probability distributions; sampling distributions, estimations of parameters using confidence intervals, hypothesis tests

regarding a parameter, and inferences on two samples.

### **Sections to be covered:**

Chapter 1: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6

Chapter 2: 2.1, 2.2, 2.3

Chapter 3: 3.1, 3.2, 3.3 (weighted mean only), 3.4, 3.5

Chapter 4: 4.1, 4.2, 4.3

Chapter 5: 5.1, 5.2, 5.3, 5.4

Chapter 6: 6.1, 6.2

Chapter 7: 7.1, 7.2, 7.3, 7.4 (can be abbreviated, if necessary)

Chapter 8: 8.1, 8.2

Chapter 9: 9.1, 9.2, 9.3

Chapter 10: 10.1, 10.2, 10.3, 10.4

Chapter 11: 11.1, 11.2, 11.3, 11.4

### **Course Requirements:**

In order to accomplish the learning outcomes of this course, the learner is required to

- Attend class lectures
- Participate in class activities
- Read and study assignments
- Solve assigned problem sets
- Complete test, quizzes, homework, etc.
- Complete a comprehensive final exam

### **If you do not take a final exam, you cannot pass the course.**

### **Course Evaluation and Grading:**

Homework, in-class group work, and workbooks – 15%

Four in-class tests – 60%

**Departmental** comprehensive final exam – 25%

**NOTE:** The final will only be given at the time noted below (under important dates) in the regular class meeting room. Any student who misses the scheduled final exam will automatically be assigned the grade of F.

**Grading Scale:** A: 90-100%; B: 80-89%; C: 70-79%; D: 60-69%; F: Below 60%.

## **Final Exam:**

The final examination is a Mathematics Department, multiple-choice, comprehensive examination given to all students enrolled in MATH 1530. Students are required to have completed the final examination as per the scheduled date/time for their respective section: see Academic Calendar on MTSU Pipeline. The final examination is closed book and closed notes (except for allowed 8 ½ x 11 note sheet). Unexcused absences for the final examination result in a course grade of F.

**Note:** Students are responsible for and required to bring the following materials to the final examination: (1) a large scantron, Form No. 4521, (2) a TI 83 or 84 Plus graphing calculator, (3) a #2 pencil, and (4) an 8 ½ x 11 sheet of paper containing student preferred information.

**Note:** The results of the final exam may be used for departmental and University study as a part of the Tennessee Board of Regents assessment of general education. Please know that no names will appear in the study and the anonymity of all test scores is assured. Your participation in the study is voluntary, and your decision to participate or not will not affect your course grade or your standing with Middle Tennessee State University.

## **Important Dates:**

Last Day to drop without a grade: Jan 27

Last Day to drop with a W: Mar 24

Test 1: Feb 4

Test 2: Feb 25

Test 3: Mar 27

Test 4: Apr 22

Final Exam Time and Date: 12:30 pm – 2:30 pm Apr 29

## **Judicial Statement/Academic Misconduct:**

Academic misconduct is defined as plagiarism, cheating, fabrication, or facilitating any such act. For purposes of this section, the following definitions apply:

**Plagiarism.** The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper acknowledgment.

**Cheating.** Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term academic exercise includes all forms of work submitted for credit or hours.

**Fabrication.** Unauthorized falsification or invention of any information or citation in an academic exercise.

**Facilitation.** Helping or attempting to help another to violate a provision of the institutional code of academic misconduct.

Academic misconduct will result in actions taken as defined by the MTSU code of Academic Integrity. A complete description of this code can be found at [Judicial Affairs](http://www.mtsu.edu/judaff/) (<http://www.mtsu.edu/judaff/>). In addition to other possible disciplinary sanctions that may be imposed through regular institutional procedures as a result of academic misconduct, the instructor has the right to assign an F or a zero for the work in question, or to assign an F for the course. If a student believes he or she has been falsely accused of academic misconduct, and if his or her final grade has been lowered as a result, the student may appeal the case through the appropriate institutional procedures.

### **Drop/Withdrawal Policy and Dates:**

Please note the Drop Policy and Withdrawal Procedures as they are stated in the Current Registration Guide. A grade of "I" will be given only in accordance with University Policy. No grade of "W" will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student's control. In particular, a "W" will not be granted merely because the student is failing. Students should be aware that missing the official drop date and thereby receiving an "F" can have ramifications on financial aid.

### **General Conduct in Class:**

The instructor has primary responsibility for control over all classroom behavior and can direct the temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or conduct which otherwise violates the general rules and regulations of MTSU.

### **Attendance and Make-Up Policy:**

You are expected to attend class. Attendance will be taken at the discretion of the instructor. Make-ups will not be given for anything other than in-class exams, and only with the instructor's prior consent (emergencies excepted). A University approved excuse must be provided in order to be given a make-up exam and, depending on circumstances, the instructor has the right to not give a make-up exam.

### **Lottery Scholarship Policy:**

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your [Lottery Statement of Understanding form](#) (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your [MT One Stop Enrollment Counselor](#) (<http://www.mtsu.edu/one-stop/counselor.php>).

### **Free Tutoring:**

Math tutoring for this course is available as a free service to MTSU students in the James E. Walker Library, 1<sup>st</sup> floor. Tutoring is fundamental to your success as a student. At every level of your academic journey, you will discover that tutoring assists your understanding, recollection, and application of what was presented in the classroom.

Take advantage of our FREE tutoring service and learn how to study, get help with understanding difficult course material, receive better test grades, or simply improve your grade point average. Tutoring is available in study skills and learning strategies that includes sessions on time management, notetaking, when and where to study, and memory principles. Tutoring is also available in over 200 courses including biology, history, computer information systems, physics, math, psychology, chemistry, economics, recording industry, and many more. The central location for tutoring is the Tutoring Spot, located in Walker Library, but is also conducted at various other campus sites. For available tutoring opportunities, visit <http://mtsu.edu/studentsuccess/tutoring.php#on>. For questions, call the Tutoring Spot at 615-904-8014.

**Reasonable Accommodations for Students with Disabilities:**

Reasonable Accommodations for Students with Disabilities: Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the [Disability & Access Center](#) (DAC) website (<http://www.mtsu.edu/dac>) and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu).

**MATH 1910 CALCULUS  
COURSE SYLLABUS-Spring Semester 2019**

**Instructor:** Prof. Bouldin-Tenpenny elaine.tenpenny@mtsu.edu  
KOM 201-C  
Phone: 898-2865

**Office Hours:** To be posted in D2L under announcements

**COURSE TITLE:** Calculus I

**PREREQUISITE:**

This course requires a grade of C or better in Math 1730 or its equivalent. Familiarity with graphing calculators (TI-83, 84, etc) is required. You may not use graphing calculators with symbolic manipulation software (DERIVE, MAPLE, etc.) on exams.

**TEXTBOOK:** Calculus: Early transcendentals, 8<sup>th</sup> edition by James Stewart

**PURPOSE:** This is a course on differential calculus with an introduction to integral calculus. It is the first in a sequence of three courses designed to provide the computational tools necessary for continued work in physics, engineering, and more advanced mathematics. All three must be completed to gain thorough exposure to all the standard calculus topics.

**COURSE REQUIREMENT:** In order to complete this course successfully, the learner is required to:

- a. Attend class lectures
- b. Participate in class activities
- c. Read and study class assignments
- d. Solve assigned problems sets
- e. Successfully complete tests
- f. Use technology where appropriate.

**CHAPTERS/SECTIONS:**

We will cover information in Chapters 2-5

**COURSE EVALUATION:**

**WEBASSIGN:** There are homework problems set up for each section that we cover. They are there to help you understand the sections and are not required. To use webassign you will need a webassign code for this class. If you buy your textbook in the bookstore, the code will come packaged with it. If you buy your textbook from another source, it may or may not come with the webassign code. If it does not, you can buy the code at [webassign.net](http://webassign.net).

**Review Quizzes:** There will be 4 quizzes given during the semester. These quizzes will cover basic algebra, log and trig concepts. A quiz will be given on each test review day during the last 15-20 minutes of class. The quiz scores will total 40 possible points (10 points each quiz). There will be no make-up quiz given. If you miss a quiz, then you will lose 10 of the possible 40 points. This will be true for each quiz missed.

**Tests:** Four major tests will be given throughout the semester. These tests will be worth 100 points each. There are no makeups for missed tests. If you do miss a test and valid documentation is provided to the instructor, the comprehensive final will count as the makeup. If you miss more than one test, you will receive a zero on those missed tests. If you have to miss a test because of a school function, see me to make arrangements to take the test BEFORE the scheduled test date. PLEASE NOTE: In order to be allowed to take a test, you must attend class on a regular basis.

**Tests:** Tentative Test Dates : All classes

Test 1: February 11, 2019

Test 2: March 18, 2019

Test 3: April 8, 2019

Test 4: April 22, 2019

**Final:** A final exam will be given. The final is comprehensive and is worth 200 points. Each student must take the final exam. Failure to take the final will result in an F for the final course grade.

Final exam :           **Math 1910-007-** Monday, April 29, 2019    9:30am-11:30am

**Math 1910-009-** Tuesday, April 30, 2019    8:00am-10:00am

**Math 1910-014-** Wednesday , May 1, 2019    10:00am-12:00pm

**Attendance policy:** You must attend class on a regular basis in order to be allowed to take a test. If you miss multiple days before a test, you will not be allowed to take the test and will receive a zero on that test.

I will call roll at the first of each class. If you come in late, it is your responsibility to inform me at the end of that class. If you are late three times, that will count as one absence. If you do not miss more than 2 days (excused or unexcused) during the semester, you will earn 10 points to be added to your final total points.

Your final course grade will be determined by your end of the class total points. There are 640 possible points. (Plus the bonus points if you earn them from attendance.)

Quizzes: 40 points

4 Tests (100 points each): 400 points

Final: 200 points

Grading Scale:

A: 576-640 points

B: 512-575 points

C: 448-511 points

D: 384-447 points

F: Below 384 points

### **MATH HELP LAB:**

Math tutoring is available as a free service to MTSU students in KOM 252.

Tutoring is conducted by Graduate Teaching Assistants (GTA's), work study aids, and a faculty moderator.

The lab is closed on weekends and MTSU scheduled holidays. Days and times for tutoring specific topics are posted on the bulletin board outside room KOM 252. Please sign in with your name, course and instructor when you enter the lab.

### **LAB SCHEDULE: To be posted in D2L under announcements**

#### **PLEASE NOTE THE FOLLOWING DATES AND INFORMATION:**

- 1/27/2019 - Last day to drop without a grade.
- 3/24/2019 - Last day to drop with a "W".
- A grade of I will be given only in accordance with the University Policy.
- **Reasonable Accommodations for Students with Disabilities:** Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the [Disability & Access Center \(DAC\) website](#) and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu).

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

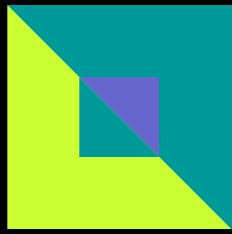
For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your MT One Stop Enrollment Counselor (<http://www.mtsu.edu/one-stop/counselor.php>).

**•Departmental Drop Policy:** No grade of W will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student's control. In particular, a W will not be granted merely because the student is failing.

**NOTE:**

1. In order to be counted as present in a class, each student must participate in class activities. Therefore, each student is required to **purchase the textbook and bring it to class every day**. You will be expected to use this textbook during class. You will also be expected to take notes. Reading newspapers, books or working on other class homework is not allowed in this math class.
2. If you must leave your cell phone on, please set it to vibrate mode and leave it put away. If you must answer your phone during class, please quietly leave the room to do so. PLEASE DO NOT SEND TEXT MESSAGES OR TAKE PICTURES OR DO ANY TYPE OF RECORDING DURING CLASS TIME.
3. If we have snow and the University is not closed, please check your MTSU email. If we are not going to meet that day, I will send an email to the class.

Note: The syllabus and schedule may change at the discretion of the instructor.



# *MATH 2010 - LINEAR ALGEBRA*

*Syllabus, Grading scale, Contact*

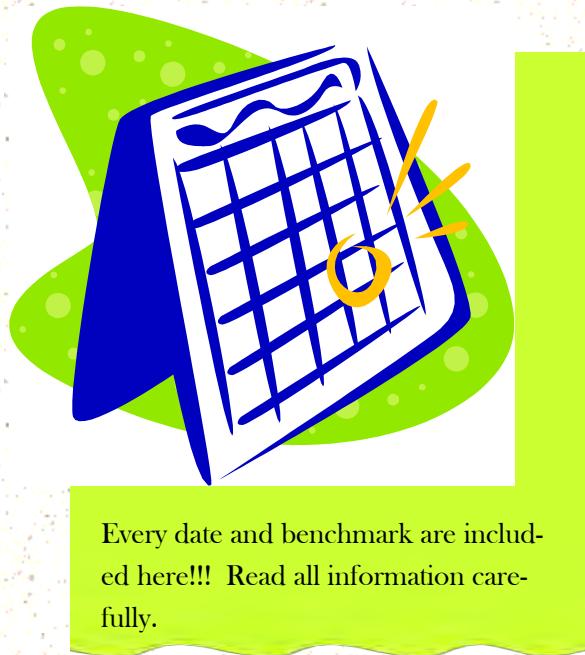
*Information, and More*

*Spring 2019*

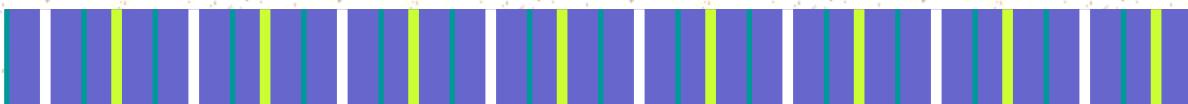
*(Section 1 -MWF)*

## Inside this booklet:

Instructor/Course Information	2
Course Syllabus	3
Grading Policies	4
University Policies	5
Course Schedule	6
Homework	7
Sample Grading sheets	8



Every date and benchmark are included here!!! Read all information carefully.



## Instructor Information:

Mary Martin, PhD

KOM 322C

Department of Mathematical Sciences

Phone : 615-904-8236

Email: [mary.martin@mtsu.edu](mailto:mary.martin@mtsu.edu)

## Course Information:

Time:	8:00 -8:55 am; MWF
Room:	KOM 300
Prerequisites	MATH 1910—Calculus I (C or better)
Text:	<u>Elementary Linear Algebra, 8th edition</u> by Ron Larson
Technology:	TI-83 plus or TI-84-plus; calculator must be able to perform row reductions and reduction to reduced echelon form
Office Hours:	9:00-11:00 MW, 1:00 - 2:00 TR <u>and other times by appointment</u>

# Math 2010 - Linear Algebra

## Course Syllabus

<b>Purpose:</b>	Vector spaces, vectors, and matrices are major tools in multi-dimensional mathematics; thus this course is crucial to the study of multi-dimensional geometry, computer science, business, physics, and engineering. The purpose of the course is to systematically develop the definitions, processes and applications associated with vectors. The course will begin with basic definitions and develop the arithmetic properties and analytic processes of vectors and matrices; applications will be included as material is developed.
<b>Learning Objectives:</b>	<ul style="list-style-type: none"><li>◆ Enhanced mathematical and problem solving skills.</li><li>◆ Learned the basic definitions and arithmetic properties of vectors and matrices.</li><li>◆ Developed an understanding of the geometric implications of vectors and matrices.</li><li>◆ Understand the role and properties of functions between multi-dimensional spaces.</li><li>◆ Learn the use of technologies which are appropriate to the material in the course.</li><li>◆ Appreciate the variety of applications of linear algebra; achieve competence in several application areas.</li><li>◆ Understand the role of matrices in structuring calculations and as mathematical elements in their own right.</li></ul>
<b>Typical Outline:</b>	This course will include material from Chapters 1-7 of the required text, along with a selection of applications. For additional information, see the <a href="#">Course Schedule</a> . Topics included in the course consist of: <ul style="list-style-type: none"><li>◆ Matrices and Systems of Linear Equations</li><li>◆ Determinants</li><li>◆ Vectors in 2,3, and n-dimensional Spaces</li><li>◆ General Vector Spaces and products in vector spaces</li><li>◆ Linear Transformations , with special reference to those maps from n dimensional to m dimensional Euclidean spaces</li><li>◆ Eigenvalues, Eigenvectors and Diagonalization</li></ul>
<b>Grading:</b>	Knowledge will be assessed and grades will be assigned according to the <a href="#">grading scale</a> . The grading scale is found later in this booklet in the grading policy section, p.4
<b>General information:</b>	<ul style="list-style-type: none"><li>• Participation grade: See information in grading policy, p. 4. Missing classes will negatively affect your grade immediately and continuously. <b><u>There will be no make-up tests unless arrangements are made in advance in writing and can be documented. There will be no make-up tests for casual misses.</u></b></li><li>• A grade of I will be given only in accordance with University policy; this means all requests must be documented and represent legitimate, recognized causes for missing work at the end of the semester.</li><li>• The last day to drop without a grade is January 20. The last day to drop with a W is March 24. The final exam is scheduled according to the University calendar and will not be changed. For this course, the final exam will be given on May 1, 2019 at 7:30 -9:30 am.</li><li>• <b><u>The syllabus may change at the discretion of the instructor.</u></b></li></ul>



# MATH 2010 -Grading Policies

Evaluation of your grade in the course will be made based on the following assignments:

3 in-class tests	300 points (100 points each)
Comprehensive final	200 points
Definition Tests (Weekly; Wednesdays)	50 points
Homework (WebAssign) (80% average on 80% attempted)	50 points

**Participation grade**-- You will start with +2 participation points. It is assumed that if you attend class, you will minimally be listening and actively trying to learn. On the other hand, if you are absent, it is not possible for you to be participating in class discussion and questioning. Therefore, each class missed will deduct 1/2 point from your participation points. At the end of your semester, your tests and homework will be averaged as above and then the positive (or negative) participation points used to adjust your test average to get your final grade. Requests for exceptions to this policy must be based on illness or severe family emergency, submitted in writing and in person in my office, with documentation. Emails are not considered sufficient notice unless they are provided in a signed hard copy form in my office.

Example: You make 95, 85, and 87 on your in-class tests. Your grade on the final is 156 out of 200 points. Your definition test grade is 100 and your project grade is 88. You have missed 6 classes. Your test/project average is  $(95+85+87+156+50+44)/600$  which gives an average of 86%. You have -1 participation points, so your grade will be 85% or a B. If you had no absences, your grade would be 88% and you would have a B+. Participation counts!!!

Grading Scale: +/- grading scale will be used:



A	90 - 100
B+	87 - 89
B	83 - 86
B-	80 - 82
C+	77 - 79
C	73 - 76
C-	70 - 72
D+	67 - 69
D	63 - 66
D-	60 - 62
F	0 - 59

## Averaging protocols—

1. 1. If you have a test average (in-class only) of higher than 90 going into the final, then the final exam will count once instead of double (if that is to your advantage).
2. 2. If you have a test average (in-class only) of 75 or greater and if you have a test score between 20-55, the lowest of your test scores will be replaced by your final exam grade (if that is to your advantage).

# University Policies:

## **Reasonable Accommodation for Students with Disabilities:**

If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with me as soon as possible. Students may also contact the Office of Disabled Students Services (615-898-2783) with questions about such services. The student is responsible for all associated paperwork and must discuss each accommodation before every event which requires special accommodation actions. The student must speak to me each time and follow up with an email.

## **Judicial Statement:**

Academic misconduct is defined as plagiarism, cheating, fabrication, or facilitating any such act. For purposes of this section, the following definitions apply: (1) Plagiarism. The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper acknowledgment. (2) Cheating. Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term academic exercise includes all forms of work submitted for credit or hours. (3) Fabrication. Unauthorized falsification or invention of any information or citation in an academic exercise. (4) Facilitation. Helping or attempting to help another to violate a provision of the institutional code of academic misconduct. Academic misconduct will result in actions taken as defined by the MTSU code of Academic Integrity. A complete description of this code can be found at <http://www.mtsu.edu/provost/acadmisconduct.php>.

## **Lottery Scholarship Policy:**

Do you have a lottery scholarship? To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, or I in this class may negatively impact TELS eligibility. Dropping a class after 14 days may also impact eligibility; if you withdraw from this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until a bachelor degree is earned; students who first received the lottery scholarship in Fall 2009 or later will additionally be limited to 120 TELS attempted hours. For additional Lottery rules, please refer to your Lottery Statement of Understanding form via RaiderNet, review lottery requirements on the web at [www.mtsu.edu/scholarships/telsconteligibility\\_scholarships.shtml](http://www.mtsu.edu/scholarships/telsconteligibility_scholarships.shtml), or contact the Financial Aid Office at 615-898-2830.

## **Department Policy With Regard To Drops after the Official Drop Date:**

No grade of *W* will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student's control. In particular, a *W* will not be granted merely because the student is failing. Students should be aware that missing the official drop date and thereby receiving an *F* can have ramifications on financial aid. There will be no drop form signed by this instructor after the official dates.

## **CBAS Technology Policy:**

The College of Basic and Applied Sciences Policy for the Appropriate Use of Hand-held and Wireless Technologies is in effect for this class. While using a device to access an ebook or a calculator is completely acceptable, other actions are not. In particular:

1. Working on homework or other outside assignments while in class is prohibited.
2. Texting or checking text messages is prohibited.
3. Recording a class is prohibited.
4. All copyright restrictions must be respected.

Penalties: Loss of participation points and/or individual assignment points. Note: Everyone in the class is entitled to his/her privacy. While it may be possible to allow recording or photos of the board, this must be announced and permission of the entire membership must be obtained at the time. Additionally, place your phone on vibrate for personal emergency notifications and notify the instructor if you expect issues to arise. Normal responsible use of technology will produce no problems and will enhance your experience in the course.

## **Notes and additional information:**



## ***MATH 2010 - Course Schedule:***

Date	Chapter	Topic
1/14/19	1.1	Introduction; Systems of Linear Equations
1/16/19	1.2	Gaussian Elimination & Gauss-Jordan Elimination; Technology
1/18/19	1.3	Applications of Systems of Linear Equations
1/21/19		MLK day; no classes
1/23/19	2.1	Operations with Matrices
1/25/19	2.2, 2.3	Properties of Matrix Operations; the Inverse of a Matrix
1/28/19		<b>Test I</b>
1/30/19	2.4	Elementary Matrices; LU- decomposition
2/1/19	2.5	Markov Chains
2/4/19	2.6	More Applications of Matrix Operations
2/6/19	3.1	The Determinant of a Matrix
2/8/19	3.2	Determinants and Elementary Operations
2/11/19	3.3	Properties of Determinants;
2/13/19	3.4	Applications of Determinants
2/15/19	4.1	Vectors in Real Space
2/18/19	4.2	Vector Spaces
2/20/19	4.3	Subspaces of Vector Spaces
2/22/19	4.4	Spanning Sets and Linear Independence
2/25/19	4.4	Spanning Sets and Linear Independence
2/27/19	4.5	Basis and Dimension
3/1/19		<b>Test II</b>
3/4/19 - 3/8/19		<b>Spring Break</b>
3/11/19	4.6	Rank of a Matrix and Systems of Linear Equations
3/13/19	4.7	Coordinates and Change of Basis
3/15/19	4.7	Coordinates and Change of Basis
3/18/19	4.7	Coordinates and Change of Basis
3/20/19	5.1	Length and Dot Product
3/22/19	5.2	Inner Product Spaces
3/25/19	5.3	Orthonormal Bases: Gram-Schmidt Process
3/27/19	5.3	Orthonormal Bases: Gram-Schmidt Process
3/29/19	6.1	Introduction to Linear Transformations

*The schedule may change at the discretion of the instructor.*



## *MATH 2010 - Course Schedule:*

**The schedule may change at the discretion of the instructor.**



# MATH 2010—Linear Algebra Exam Practice

The problems listed below are problems which will help you study for tests and for the final. Your homework grade will be obtained from your work turned in as projects. Details are on [Grading Scale](#).

Section:	Problems:
<b>Test 1:</b>	
1.1	11,14,19,26,32,34,37,40,44,46,47,51,53,55,58,60,62,67,68,75,77,79,81,85,91
1.2	28,29,33,35,38,40,41,43,45,47,48,51,65
1.3	3,6,7,9,12,13,15,16,18,20,21,22,24,31,33,37,38
2.1	6,9,11,12,13,16,17,20,21,22,24,26,37,45,48,49,50,53,55,63,69,79,81
2.2	3,11,13,19,22,25,39,42,45,46,49-52,59,62,69,72,76,77
2.3	2,10,11,17,20,23,24,27,31,34,41,43,46,47,50,51,54,61,68,70
2.4	5,6,10,11,13,16,20,21,27,33,34,43,46,47,48,51,53
<b>Test 2:</b>	
2.5	4,7,8,9,11,12,13,15,24,27,33,34,36,37,43,45,50
2.6	5,8,11,12,13,14,20,24,26,27
3.1	5,12,19,21,23,26,29,37,39,40,45,49,55,58,63,66
3.2	21,22,26,29,30,34,35,39,44
3.3	8,12,15,25,29,33,45,55,75
3.4	38,40,53,54,56,61
4.1	8,14,16,25,30,35,4,44,47,48,50,53,65-68
4.2	13,15,18,21,22,25,26,31,32,45,47
4.3	3,4,5,8,11,15,17,21,26,27,28,30,32,36,37,39,41,47,48
4.4	2,3,5,8,11,12,15,17,22,24,30,31,34,35,39,40,41,42,45,45,47,50,52,54,56,57,61,65,66,67,68,73,75,76
4.5	1-6, 8,11,13,17,19,20,25,27,29,31,32,35-38,40,42,45,48,50,54,55,71,73,75,78

**Required Text:** *Elementary Linear Algebra, 8th edition* by Ron Larson

You are responsible for all the assigned homework and the examples in the book; this material will be covered on the test. Your graded project/homework grades generally will be selected from these problems.

**Note:** The syllabus and schedule may change at the discretion of the instructor. Your final exam time can be found in the University calendar.



MATH 2010—Linear Algebra Exam Practice



The problems listed below are problems which will help you study for tests and for the final. Your homework grade will be obtained from your work turned in as projects. Details are on [Grading Scale](#).

**Note:** The syllabus and schedule may change at the discretion of the instructor. Your final exam time can be found in the University calendar.

# **Math 2050: Probability and Statistics**

**MWF 10:20-11:15 am, KOM 225, Spring 2019**

**Instructor:** Dr. Ginger Holmes Rowell

**Phone:** 615-898-5540

**Office Hours:** MWF: 8:30 am – 10:00am

**Office:** KOM 325-F

**E-mail:** [Ginger.Rowell@mtsu.edu](mailto:Ginger.Rowell@mtsu.edu)

**Text:** Whitlock and Schluder, 2<sup>nd</sup> Ed. *The Analysis of Biological Data* (physical textbook): ISBN# 9781936221486    **OR**    *The Analysis of Biological Data* (eBook): ISBN# 9781319156718

**Course Description:** The objective of this course is to introduce the basic concepts of statistics, probability theory, estimation of parameters, statistical inferences, and hypothesis testing.

**Tool:** You need to have a calculator that will help you to complete the statistical computations (i.e. TI 83/84).

**Attendance:** Attendance is required. Each student is responsible for all material covered and homework assignments/quizzes given or due even if you are absent.

**Grading:** There are three tests, homework/quizzes, and a comprehensive final exam

<b>Test 1</b>	<b>02-13-19</b>	<b>100pts</b>
<b>Test 2</b>	<b>03-25-19</b>	<b>100pts</b>
<b>Test 3</b>	<b>04-17-19</b>	<b>100pts</b>
<b>Homework/quizzes/other – throughout the semester</b>		<b>100pts</b>
<b>Final Exam</b>	<b>04-29-19 (9:30-11:30am)</b>	<b>200pts</b>

The final grade is based on a student's two best test grades, the final exam, the total "homework" points, where  
A: 450 - 500pts      B: 400 - 449pts      C: 350 - 399pts      D: 300 - 349pts      F: Below 300pts

## **PLEASE NOTE THE FOLLOWING DATES AND INFORMATION:**

- January 14 – Classes begin
- January 27- Last day to withdraw without a grade
- March 4 – 8 – Spring Break
- March 24 - Last day to withdraw with a grade of a "W"
- Last day of class: April 24<sup>th</sup>.
- If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with me as soon as possible. Students may also contact the Office of Disabled Students Services (898-2783) with questions about such services.

## **Judicial Statement/Academic Misconduct:**

Academic misconduct is defined as plagiarism, cheating, fabrication, or facilitating any such act. For purposes of this section, the following definitions apply:

**Plagiarism.** The adoption or reproduction of ideas, words, statements, images, or works of another person as one's own without proper acknowledgment.

**Cheating.** Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term academic exercise includes all forms of work submitted for credit or hours.

**Fabrication.** Unauthorized falsification or invention of any information or citation in an academic exercise.

**Facilitation.** Helping or attempting to help another to violate a provision of the institutional code of academic misconduct.

Academic misconduct will result in actions taken as defined by the MTSU code of Academic Integrity. A complete description of this code can be found at [Judicial Affairs](http://www.mtsu.edu/judaff/) (<http://www.mtsu.edu/judaff/>). In addition to other possible disciplinary sanctions that may be imposed through regular institutional procedures as a result of academic misconduct, the instructor has the right to assign an F or a zero for the work in question, or to assign an F for the course. If a student believes he or she has been falsely accused of academic misconduct, and if his or her final grade has been lowered as a result, the student may appeal the case through the appropriate institutional procedures.

### **Drop/Withdrawal Policy and Dates:**

Please note the Drop Policy and Withdrawal Procedures as they are stated in the Current Registration Guide. A grade of "I" will be given only in accordance with University Policy. No grade of "W" will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student's control. In particular, a "W" will not be granted merely because the student is failing. Students should be aware that missing the official drop date and thereby receiving an "F" can have ramifications on financial aid.

### **General Conduct in Class:**

The instructor has primary responsibility for control over all classroom behavior and can direct the temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or conduct which otherwise violates the general rules and regulations of MTSU.

### **Attendance and Make-Up Policy:**

You are expected to attend class. Attendance will be taken at the discretion of the instructor. Make-ups will not be given for anything other than in-class exams, and only with the instructor's prior consent (emergencies excepted). A University approved excuse must be provided in order to be given a make-up exam and, depending on circumstances, the instructor has the right to not give a make-up exam.

### **Lottery Scholarship Policy:**

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your [Lottery Statement of Understanding form](http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf) (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your [MT One Stop Enrollment Counselor](http://www.mtsu.edu/one-stop/counselor.php) (<http://www.mtsu.edu/one-stop/counselor.php>).

### **Free Tutoring:**

Math tutoring for this course is available as a free service to MTSU students in the James E. Walker Library, 1<sup>st</sup> floor. Tutoring is fundamental to your success as a student. At every level of your academic journey, you will discover that tutoring assists your understanding, recollection, and application of what was presented in the classroom.

Take advantage of our FREE tutoring service and learn how to study, get help with understanding difficult course material, receive better test grades, or simply improve your grade point average. Tutoring is available in study skills and learning strategies that includes sessions on time management, notetaking, when and where to study, and memory principles. Tutoring is also available in over 200 courses including biology, history, computer information systems, physics, math, psychology, chemistry, economics, recording industry, and many more. The central location for tutoring is the

Tutoring Spot, located in Walker Library, but is also conducted at various other campus sites. For available tutoring opportunities, visit <http://mtsu.edu/studentsuccess/tutoring.php#on>. For questions, call the Tutoring Spot at 615-904-8014.

## **MATH 2110 Course Syllabus**

**Data Analysis. Spring-2019**

**T: 9:40-10:35, KOM 222 (SEC: 001)**

**T: 11:20-12:15, KOM 221 (SEC: 002)**

**Goal:** Use the statistical package R to graph, analyze data and introduce basic R programming.

**Skills:**

1. Represent quantitative and qualitative data using appropriate graphical techniques.
2. Evaluate numerical summaries of a data set.
3. Demonstrate familiarity with the binomial and normal random variables.
4. Explain the Central Limit Theorem and its consequences.
5. Use confidence intervals for estimation.
6. Use hypothesis tests to compare one variable to a hypothesized value and to compare two populations.
7. Perform regression analysis and interpret the results.

**Text:** Students are not required to buy a textbook.

**Instructor Information:** Sumeda Abeykoon, Ph.D.

**Office:** KOM 201 G

**E-mail/Phone:** sumeda.abeykoon@mtsu.edu

**Office Hours:** MW (8.00 AM-10.30 AM)

### **Grading:**

Homework (group work)	55%
Midterm test	20%
Final Project	20%
Attendance	5%

If you do not submit your final project report, you will automatically have F grade.

### **Grading Scale:**

A [90, 100]; B [80, 90); C [70, 80); D [60, 70); F [0, 60)

### **Important date:**

<http://www.mtsu.edu/dates.php>

<http://www.mtsu.edu/tuition/dates.php>

**January 14 - Classes Begin**

January 20 - Last day to Add/Late Register on PipelineMT.

**January 21 – Martin Luther King, Jr. Day Holiday – No Classes**

**January 27- Deadline for students to drop a course without a grade.**

**January 28 – March 24 - Students who drop a course receive automatic grade of “W”.**

**March 4-9 - Spring Break**

April 24 - Last day to withdraw from the University (all classes) and receive “W” or “F” as determined by the instructor.

**April 24 - Last Day of Classes**

**April 25 - Study Day - No Classes**

**April 26 – May 2 - Final exams.**

The current list of dates in the spring 2018 registration guide, page 4:

[https://www.mtsu.edu/registration/docs/Registration\\_Guide\\_Spring\\_2018.pdf](https://www.mtsu.edu/registration/docs/Registration_Guide_Spring_2018.pdf). The last to day

Refer following MTSU web page for all important dates. <https://www.mtsu.edu/dates.php>

**Attendance Policy:**

Attendance is required at each class meeting. Participation in University sanctioned activities or in military duties and situations where the institution’s policy on inclement weather is applicable are considered excused absences. However, non-attendance does not relieve a student of the responsibility for work covered or assigned. The instructor will keep a record of attendance for each student.

**Drop/Withdrawal Policy and Dates:**

Please note the Drop Policy and Withdrawal Procedures as they are stated in the Current Registration Guide. A grade of “I” will be given only in accordance with University Policy. No grade of “W” will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student’s control. In particular, a “W” will not be granted merely because the student is failing. Students should be aware that missing the official drop date and thereby receiving an “F” can have ramifications on financial aid.

**General conduct in class:**

The instructor has primary responsibility for control over all classroom behavior and can direct the temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or conduct which otherwise violates the general rules and regulations of MTSU.

**Make-Up Policy:**

Make-ups will not be given for anything other than in-class exams, and only with the instructor's prior consent (emergencies excepted). A University approved excuse must be provided in order to be given a

make-up exam and, depending on circumstances, the instructor has the right to not give a make-up exam.

#### **Reasonable Accommodation for Students with Disabilities:**

**Reasonable Accommodations for Students with Disabilities:** Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu).

#### **ACADEMIC AND CLASSROOM MISCONDUCT**

The instructor has the primary responsibility for maintenance of academic integrity and controlling classroom behavior, and can order the temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or conduct that violates the general policies of the Institution for each class session during which the conduct occurs. Extended or permanent exclusion from the classroom, beyond the session in which the conduct occurred, or further disciplinary action can be effected only through appropriate procedures of the Institution. If an instructor wishes to remove a student from the classroom for a longer period of time or permanently, he/she must refer the student to the Office of Judicial Affairs and Mediation Services.

Disruptive behavior in the classroom may be defined as, but not limited to, behavior that obstructs or disrupts the learning environment (e.g., offensive language, harassment of students and professors, repeated outbursts from a student which disrupts the flow of instruction or prevents concentration on the subject taught, failure to cooperate in maintaining classroom decorum, etc.), text messaging, and the continued use of any electronic or other noise or light emitting device which disturbs others (e.g., disturbing noises from beepers, cell phones, palm pilots, lap-top computers, games, etc.).

Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students found responsible of engaging in academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions which may be imposed through the process provided in MTSU Policy III:00:08, Academic Misconduct, the instructor has the authority to assign an appropriate grade for the exercise or examination, or to assign an F in the course, as is proportional to the nature and extent of the academic misconduct. When a student has engaged in academic misconduct, the faculty member shall ensure that the student is made aware of his/her appeal rights.

All matters involving academic misconduct will be processed as set out in MTSU Policy III:00:08 Academic Misconduct. If not resolved prior to a hearing, these matters will be heard by the Academic Misconduct Committee which will convene a hearing to determine whether the conduct constitutes academic misconduct and, if so, whether additional disciplinary sanctions should be imposed. If the Committee determines there was no academic misconduct, it will direct any grade assigned to be

changed as it determines is appropriate. Courses may not be dropped pending the final resolution of an allegation of academic misconduct.

**Lottery Scholarship Requirements:**

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

# **MATH 2530**

## **Course Syllabus**

### **Course Title: Math 2530, Applied Statistics II**

#### **Description:**

Applied Statistics II. Three credits. This course is an exploration of the application of the following statistical methods: analysis of variance; simple and multiple regression models; categorical data analysis; and nonparametric methods.

#### **Prerequisites:**

MATH 1530 or MATH 2050 or equivalent.

#### **Semester, Section Number, and Classroom:**

Fall 2017, 001, BAS S301

#### **Instructor: Dr. Lisa B. Green**

**Office: KOM 325 E**

**E-mail: lisa.green@mtsu.edu**

**Phone: 615-898-5775**

**Office Hours: M 2:30-4:00, Tu 1:00-2:30, Th 11:00-12:00 and by appointment**

#### **Webpage:**

D2L and MyStatLab

#### **Attendance:**

Attendance is required at each class meeting. Participation in University sanctioned activities or in military duties and situations where the institution's policy on inclement weather is applicable are considered excused absences. However, non-attendance does not relieve a student of the responsibility for work covered or assigned. The instructor will keep a record of attendance for each student.

#### **Text:**

Students are not required to buy a textbook. I will be referring to STAT2: Building Models for a World of Data, Cannon, Cobb, et. al. MacMillan.

#### **Course Topics:**

- ❖ Simple Linear Regression
  - Interpretation of the model.
  - Inference about the parameters.
- ❖ Multiple Linear Regression
  - Interpretation of the model.
  - Inference about the parameters.
  - Correlation between predictors.
- ❖ One-Way Analysis of Variance
  - Interpretation of the model.
  - Inference

- ❖ Two-way Analysis of Variance
  - The Main Effects Model
  - Interaction
- ❖ Categorical Data Analysis
  - Odds ratios
  - Chi-squared tests
  - Simpson's paradox
  - Logistic Regression
- ❖ Nonparametric Data Analysis
  - Randomization-based tests
  - Wilcoxon tests.

## **Course Requirements:**

In order to accomplish the learning outcomes of this course, the learner is required to

- Attend class lectures
- Participate in class activities
- Read and study assignments
- Solve assigned problem sets
- Complete test, quizzes, homework, etc.
- Complete a comprehensive final exam

**If you do not take a final exam, you cannot pass the course.**

## **Course Evaluation and Grading:**

Homework and in-class group work – 25%

Test 1 – 25%

Test 2 – 25%

Final exam – 25%

NOTE: The final will only be given at the time noted below (under important dates) in the regular class meeting room. Any student who misses the scheduled final exam will automatically be assigned the grade of F.

**Grading Scale:** A: 90-100%;      B: 80-89%;      C: 70-79%;      D: 60-69%;      F: Below 60%.

## **Important Dates:**

Last Day to drop without a grade: September 10, 2017

Last Day to drop with a W: November 1, 2017

Test 1: Tuesday, September 26, 2017

Test 2: Thursday, November 2, 2017

Final Exam Time and Date:      Tuesday, December 12, 3:30-5:30

## **Judicial Statement/Academic Misconduct:**

Academic misconduct is defined as plagiarism, cheating, fabrication, or facilitating any such act. For purposes of this section, the following definitions apply:

**Plagiarism.** The adoption or reproduction of ideas, words, statements, images, or works of another person as

one's own without proper acknowledgment.

**Cheating.** Using or attempting to use unauthorized materials, information, or study aids in any academic exercise. The term academic exercise includes all forms of work submitted for credit or hours.

**Fabrication.** Unauthorized falsification or invention of any information or citation in an academic exercise.

**Facilitation.** Helping or attempting to help another to violate a provision of the institutional code of academic misconduct.

Academic misconduct will result in actions taken as defined by the MTSU code of Academic Integrity. A complete description of this code can be found at [Judicial Affairs](http://www.mtsu.edu/judaff/) (<http://www.mtsu.edu/judaff/>). In addition to other possible disciplinary sanctions that may be imposed through regular institutional procedures as a result of academic misconduct, the instructor has the right to assign an F or a zero for the work in question, or to assign an F for the course. If a student believes he or she has been falsely accused of academic misconduct, and if his or her final grade has been lowered as a result, the student may appeal the case through the appropriate institutional procedures.

### **Drop/Withdrawal Policy and Dates:**

Please note the Drop Policy and Withdrawal Procedures as they are stated in the Current Registration Guide. A grade of "I" will be given only in accordance with University Policy. No grade of "W" will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student's control. In particular, a "W" will not be granted merely because the student is failing. Students should be aware that missing the official drop date and thereby receiving an "F" can have ramifications on financial aid.

### **General Conduct in Class:**

The instructor has primary responsibility for control over all classroom behavior and can direct the temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or conduct which otherwise violates the general rules and regulations of MTSU.

### **Attendance and Make-Up Policy:**

You are expected to attend class. Attendance will be taken at the discretion of the instructor. Make-ups will not be given for anything other than in-class exams, and only with the instructor's prior consent (emergencies excepted). A University approved excuse must be provided in order to be given a make-up exam and, depending on circumstances, the instructor has the right to not give a make-up exam.

### **Lottery Scholarship Policy:**

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your [Lottery Statement of Understanding form](http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf) (<http://www.mtsu.edu/financial-aid/forms/LOTFOD.pdf>) or contact your [MT One Stop Enrollment Counselor](http://www.mtsu.edu/one-stop/counselor.php) (<http://www.mtsu.edu/one-stop/counselor.php>).

### **Math Tutoring Lab (MTL):**

Math tutoring for this course is available as a free service to MTSU students in the James E. Walker Library, 1<sup>st</sup> floor. Tutoring is fundamental to your success as a student. At every level of your academic journey, you will discover that tutoring assists your understanding, recollection, and application of what was presented in the classroom. For more information about this student success service for your particular department and course, go to the [Student Success website](http://www.mtsu.edu/studentsuccess/centralized-tutoring.php) and conduct a search for tutoring resources on campus.

(<http://www.mtsu.edu/studentsuccess/centralized-tutoring.php>)

**Reasonable Accommodations for Students with Disabilities:**

Reasonable Accommodations for Students with Disabilities: Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the [Disability & Access Center](#) (DAC) website (<http://www.mtsu.edu/dac>) and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu).

**Course Title:** Regression Analysis      **Room:** KOM 221

**Course No.:** STAT 4360    **CRN:** 14118

**Prerequisites:** STAT 3150 (Mathematical Statistics I) or equivalent

**Instructor:** Dr. Dennis Walsh

**Office:** KOM 203D      **Office Hours:** Mon/Wed 8:00 – 10:00, 2:00 – 5:00  
**Phone:** 898-2224 (office)      Tue/Thr 2:30 – 4:30  
                                      898-2669 (dept. off.)      Fri 8:00 – 10:00  
                                      (other hours available by appointment)

**Dept. Fax:** 898-5422      **E-Mail:** dwalsh@mtsu.edu

**Text :** *An Introduction to Statistical Methods and Data Analysis*, 5th or 6th edition,  
Ott & Longnecker, Duxbury

**Purpose** : This course presents the theory and application of statistical regression models. Approaches to model building and data analysis are emphasized. Computation and interpretation of results are facilitated through the use of statistical software.

**Objectives** : Upon completion of this course, students will have

1. Understood the importance of regression models in describing statistical relationships, in prediction problems, and in testing hypotheses;
2. Acquired the ability to build models for both simple and multiple regression situations;
3. Learned techniques of residual analysis and other diagnostic measures;
4. Applied transformations to satisfy necessary model assumptions;
5. Gained familiarity with statistical software that facilitates regression analysis;
6. Recognized the importance of visual displays in analyzing data;
7. Used linear regression in problems drawn from many areas of application including advertising, engineering, genetics, law, medicine, nutrition, pharmacy, psychology, sociology, etc.

**Topics :** The course covers selected topics from the textbook, including:

1. Review of some basic results in statistics and probability; introduction to MINITAB statistical software.
  2. Method of least squares and simple linear regression
  3. Correlation between random variables
  4. Analysis of variance and testing for a regression relation
  5. Diagnostic/remedial measures, residual analysis, and variable transformations
  6. Multiple regression models
  7. Model building, assessment, and refinement

## **Requirements :**

Activities required of students:

1. Participate in class activities.
2. Read and study text assignments.
3. Solve assigned problems/ take-home quizzes.
4. Succeed on tests.
5. Succeed on final examination.

## **Attendance:**

Attend every class. Prompt notification of an absence is required. If a student misses a test for a legitimate reason that is promptly reported, the instructor will either give a make-up test or reweigh the final exam. A grade of W or I will be given only in accordance with the University policy. The highest score possible on an assignment/test that is turned in late is the lowest score of the students who were not late. If a student misses a class, it is the student's responsibility to obtain class notes from a classmate.

## **Evaluation:**

The semester grade will be based on tests (60%), final exam (20%), assignments (15%), and class participation/attendance (5%). Letter grades will be assigned according to the scale: A for [90,100], B for [80, 89], C for [70, 79], D for [60, 69], F for [0, 59].

## **Reasonable Accommodation for Students with Disabilities:**

Middle Tennessee State University is committed to campus access in accordance with Title II of the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act of 1973. Any student interested in reasonable accommodations can consult the Disability & Access Center (DAC) website and/or contact the DAC for assistance at 615-898-2783 or [dacemail@mtsu.edu](mailto:dacemail@mtsu.edu).

## **Academic and Classroom Misconduct:**

The instructor has the primary responsibility for maintenance of academic integrity and controlling classroom behavior, and can order the temporary removal or exclusion from the classroom of any student engaged in disruptive conduct or conduct that violates the general policies of the Institution for each class session during which the conduct occurs. Extended or permanent exclusion from the classroom, beyond the session in which the conduct occurred, or further disciplinary action can be effected only through appropriate procedures of the Institution. If an instructor wishes to remove a student from the classroom for a longer period of time or permanently, he/she must refer the student to the Office of Judicial Affairs and Mediation Services.

Disruptive behavior in the classroom may be defined as, but not limited to, behavior that obstructs or disrupts the learning environment (e.g., offensive language, harassment of students and professors, repeated outbursts from a student which disrupts the flow of instruction or prevents concentration on the subject taught, failure to cooperate in maintaining classroom decorum, etc.), text messaging, and the continued use of any electronic or other

noise or light emitting device which disturbs others (e.g., disturbing noises from beepers, cell phones, palm pilots, lap-top computers, games, etc.).

Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students found responsible of engaging in academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions which may be imposed through the process provided in MTSU Policy III:00:08, Academic Misconduct, the instructor has the authority to assign an appropriate grade for the exercise or examination, or to assign an F in the course, as is proportional to the nature and extent of the academic misconduct. When a student has engaged in academic misconduct, the faculty member shall ensure that the student is made aware of his/her appeal rights.

All matters involving academic misconduct will be processed as set out in MTSU Policy III:00:08 Academic Misconduct. If not resolved prior to a hearing, these matters will be heard by the Academic Misconduct Committee which will convene a hearing to determine whether the conduct constitutes academic misconduct and, if so, whether additional disciplinary sanctions should be imposed. If the Committee determines there was no academic misconduct, it will direct any grade assigned to be changed as it determines is appropriate. Courses may not be dropped pending the final resolution of an allegation of academic misconduct.

### **Lottery Scholarship Requirements:**

Do you have a lottery scholarship? To retain the Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. A grade of C, D, F, FA, or I in this class may negatively impact TELS eligibility.

If you drop this class, withdraw, or if you stop attending this class you may lose eligibility for your lottery scholarship, and you will not be able to regain eligibility at a later time.

For additional Lottery rules, please refer to your Lottery Statement of Understanding form (<http://www.mtsu.edu/financial-aid/forms/LOTFEV.pdf>) or contact your MT One Stop Enrollment Coordinator (<http://www.mtsu.edu/one-stop/counselor.php>).

### **Department Policy with Regard to Drops after the Official Drop Date:**

No grade of W will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student's control. In particular, a W will not be granted merely because the student is failing. Students should be aware that missing the official drop date and thereby receiving an F can have ramifications on financial aid.

### **Important Dates:**

January 14 ...	Classes begin
January 27 ...	Last day to drop without a grade
March 4 - 9 ...	Spring Break
March 24 ...	Last day to drop or withdraw with a grade of "W"
April 24 ...	Last Day of Classes
April 25 ...	Study Day
May 2 ...	Final Exam (1:00-3:00, comprehensive) ( <a href="http://www.mtsu.edu/registration/spring-exams.php">http://www.mtsu.edu/registration/spring-exams.php</a> )

**Stat 4380/5380: Experimental Design**  
**MW: 12:40pm -02:05pm @KOM 324, Fall 2017**

**Instructor:** Dr. Ping Zhang

**Office:** KOM 325G

**Phone:** 898-5939

**E-mail:** [pzhang@mtsu.edu](mailto:pzhang@mtsu.edu)

**Office Hours:** MWF: 8:00am – 09:00am, 10:30am – 11:30am; TR: 08:00am – 10:00pm, or by appointment

**Text:** Applied Linear Statistical Models, fifth Edition, Kutner, Nachtsheim, Neter, Li

**Course Description:** Topics include one-way analysis of variance, multiple comparison, multifactor analysis of variance, and various practical issues in experimental design. Computation and interpretation of results are facilitated through the use of statistical software packages

**Homework Assignments:** There will be a homework assignment each week. Doing homework is critically important for you to understand material covered (& also pass the tests). The missed homework assignment will be graded 0. More questions are assigned to the graduate students.

**Attendance:** Attendance is required. Each student is responsible for all material covered and homework assignments given or due even if you are absent.

**Make-up Policy:** If you know in advance you will miss a test for some reasonable reasons, please let me know as soon as possible, so that I can make arrangements for make-up test, otherwise you will have **0** grade. No one can miss the final exam even though you have best grades in the other tests.

**Evaluation:** 30% midterm exam/project + 30% final exam/project + 40% homework

**Grading scale:** A: 90---100, B: 80---89, C: 70---79, D: 60---69, F: Below 59

**PLEASE NOTE THE FOLLOWING DATES AND INFORMATION:**

- August 28 – Classes begin
- September 31 - Students who drop a course receive grade of “W”.
- October 14 – 17 – Fall Break
- November 01 - Last day to withdraw from the university and receive a “W” or “F” as determined by the instructor.
- If you have a disability that may require assistance or accommodation, or you have questions related to any accommodations for testing, note takers, readers, etc., please speak with me as soon as possible. Students may also contact the Office of Disabled Students Services (898-2783) with questions about such services.

To retain Tennessee Education Lottery Scholarship eligibility, you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative TELS GPA of 3.0 thereafter. You may qualify with a 2.75 cumulative GPA after 72 attempted hours (and subsequent semesters), if you are enrolled full-time and maintain a semester GPA of at least 3.0. A grade of C, D, F, or I in this class may negatively impact TELS eligibility. Dropping a class after 14 days may also impact eligibility; if you withdraw from this class and it results in an enrollment status of less than full time, you may lose eligibility for your lottery scholarship. Lottery recipients are eligible to receive the scholarship for a maximum of five years from the date of initial enrollment, or until a bachelor degree is earned. For additional Lottery rules, please refer to your Lottery Statement of Understanding form, review lottery requirements on the web at <http://scholarships.web.mtsu.edu/telsconteligibility.htm>, or contact the Financial Aid Office at 898-2830.

•Departmental Drop Policy: No grade of W will be assigned after the official drop date except in situations involving extreme extenuating circumstances beyond the student's control. In particular, a W will not be granted merely because the student is failing. Students should be aware that missing the official drop date and thereby receiving an F can have ramifications on financial aid.

**Note:** The contents of this syllabus are subject to change

## DATA - 1500 - Introduction to Data Science

**zNew Course/Course Reactivation v. 2.0**

### General Information

### Instructions

**TURN ON** help text before starting this proposal by clicking  in the top right corner of the heading.

**FILL IN** all fields required marked with an \*. You will not be able to launch the proposal without completing required fields.

**CLICK ON Save All Changes** after each section.

**LAUNCH** proposal by clicking  in the top left corner.

**NAVIGATE** to the top right side of the page and click on  within the Proposal Toolbox (once proposed changes are made) to **move** the Proposal forward.

<b>New Course/ Reactivation*</b>	<input checked="" type="radio"/> New course <input type="radio"/> Course reactivation	
<b>Department/ College*</b>	College of Basic and Applied Sciences	
<b>Effective term</b>	Summer 2019	
<b>Course type*</b>	Data Science	
<b>Course prefix*</b>	DATA	<b>Course no.*</b> 1500
<b>Full course title (100 characters only)*</b> Introduction to Data Science		
<b>Abbreviated course title (30 characters only)*</b> Introduction to Data Science		
<b>Credit hours*</b> 3	<b>Contact hours (if different)</b>	
<b>Grading*</b> <input checked="" type="radio"/> Standard <input type="radio"/> Pass/Fail		

**Repeatable for additional credit\***  Yes  No

If yes, number of repeats

OR total hours

Schedule type\*

Lecture (LEC)

Instructional method\*

Conventional Methodology (CON)

6-digit CIP Code

Data Model/Warehouse DB Admin (110802)

**NOTE: The prescribed requirement (below) is for lower-division courses (1000-2000 level) that will require completion of prescribed requirements (k courses).**

Prescribed requirement  
 Writing  
 Reading  
 Math

**NOTE: If the proposed course is to be crosslisted, a New Course Approval form must be filled out for both courses. If you do not submit a New Course Approval form for the crosslisted course, it will not be created.**

Cross listed/ Dual listed?\*  Yes  No

Course to be cross listed/ dual listed BIA1500

## General Education

Is this course being proposed for General Education credit?\*  Yes  No

If yes, the appropriate General Education form must be attached.

See [http://www.mtsu.edu/gen\\_ed/submit.php](http://www.mtsu.edu/gen_ed/submit.php).

Please attach any required files by navigating to the Proposal Toolbox and clicking  in the top right corner.

Attached  I have attached the corresponding General Education form.

## FOR GENERAL EDUCATION COURSES ONLY:

Complete Catalog Description in Course Information section below and then skip to Contact Information and Routing sections (bottom of form).

## Course Information

**NOTE: If this course will be used to meet degree requirements, a Program Change form must also be completed.**

### Catalog Description

Most courses can be adequately described in fewer than forty words. The description should include main topics that are covered in the course, but a highly detailed listing of related topics does not belong in the catalog description. In general, complete sentences are not used.

<b>Catalog Description*</b>	Introduction to basic principles and tools as well as its general mindset in Data Science. Concepts on how to solve a problem with data include business and data understanding, data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication.
-----------------------------	---

**Describe any special admission and prerequisite requirements for the proposed new course. Prerequisite grade requirements default to D- unless otherwise indicated.**

<b>Course prerequisites/ co-requisites/ restrictions</b>	No prerequisites.
--	-------------------

### Course Description

**Describe the course including clinical, internship, or other experiential components.**

<b>Course description</b>	This course is an introduction to Data Science. Data science is the field of study that combines domain expertise, programming skills, and knowledge of math and statistics to extract meaningful insights from data. Data science practitioners apply machine learning algorithms to numbers, text, images, video, audio, and more to produce artificial intelligence (AI) systems that perform tasks which ordinarily require human intelligence. In turn, these systems generate insights that analysts and business users translate into tangible business value.
---------------------------	---

Being a data scientist requires an integrated skill set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions. This course will introduce students to this rapidly growing field and equip them with some of its basic principles and tools as well as its general mindset. Students will learn concepts, techniques and tools they need to deal with various facets of data science practice, including business understanding, data understanding, data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication. The focus in the treatment of these topics will be on breadth, rather than depth, and emphasis will be placed on integration and synthesis of concepts and their application to solving problems.

### Course Objectives

**Discuss the general and specific objectives of the course.****Course Objectives**

This course will introduce students to this rapidly growing field and equip them with some of its basic principles and tools as well as its general mindset. Students will learn concepts, techniques and tools they need to deal with various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modeling, descriptive modeling, data product creation, evaluation, and effective communication. It will also introduce them to the process for developing a predictive model, which includes understanding the business and data, transforming the data, building models and deploying models.

**Course Justification**

**Justify the course in terms of its uniqueness or distinctiveness and in terms of student needs.**

**Course justification**

This will be a required course in the proposed Data Science undergraduate degree. However, this class will fill a need for individuals interested in this topic. It will also be cross-listed with BIA1500 (new course) and be allowed for INFS majors and minors.

**Indicate the projected enrollment in the course and the probable source of students.**

**Projected enrollment**

We fully expect the initial enrollment to start off strong. With BIA1500 as a cross-listed class, this should bring in enough for 15 to 20 per semester. In a survey of 372 students at MTSU, 97 students indicated likely or highly likely to changing their major to Data Science if currently offered at MTSU. This shows that there is a high demand for a Data Science degree, which would make this class highly desirable.

**Describe how the proposed course relates to other courses in the departmental curricula and to the total educational curricula of the university.**

**Relation to departmental curricula**

In the proposed Data Science undergraduate degree, this will be the first class that all majors take within the core curriculum. It is meant to expose students to all aspects of Data Science from its business and data understanding ethics and practicality of its use.

**Justify any duplication. When new courses could legitimately be offered by a different department, consult with that department in advance and try to reach consensus regarding the appropriateness of the course.**

**Justify duplication and list departments consulted**

There currently are no courses at MTSU that cover an introduction of Data Science. This class was proposed by the committee that is creating the undergraduate degree, which includes individuals from Computer Science, Math, Information Systems & Analytics, and Economics and Finance.

**Indicate what contributions the course may make toward meeting service and research needs and to the overall efforts of the department, college, and university.**

**Research and service needs**

With the new Data Science Institute, the university is making a commitment to supporting this field. In part to recruiting students and faculty, it will be easier if there is a degree in place to develop an interest. This class would be a first step in promoting Data Science on campus.

**Course Integrity**

**Provide a list of faculty members who will teach the course and include pertinent information as to their qualifications. If anticipated growth will require additional faculty, indicate the number and general qualifications.**

Page 226  
Academic Affairs, Student Life, and Athletics Committee

of such new faculty.

<b>Faculty/ additional faculty</b>	The faculty for this course can be cross disciplines. Individuals that are capable of teaching this course include:
------------------------------------	---

Charles Apigian  
Professor of Information Systems & Analytics  
Interim Director of the Data Science Institute

Joshua Phillips  
Associate Professor in Computer Science

Amy Harris  
Associate Professor of Information Systems & Analytics

**Discuss any special physical facilities needed to support the proposed new course, including the adequacy of classrooms, laboratories, teaching and research equipment, and offices.**

<b>Special physical facilities</b>	Class is expected to be in a normal lecture style classroom. Any software for outside HW will be open source or Microsoft Office products.
------------------------------------	--

**Indicate whether library collections and other learning resource materials are adequate to meet the needs of the course. If they are not, indicate what arrangements have been made to assure that these materials will be available when the new course is offered.**

<b>Learning resource materials</b>	Library collections are adequate, but with a new emphasis within the library for Data Science, it is expected that more resources will continue to be added. Mary Ellen Sloane, Science Librarian, has been active in Data Science and is on the advisory board for the Data Science Institute.
------------------------------------	---

**If the course is in an area in which professional certification is available, explain how the course will contribute to certification. If the institution plans to seek new certification, indicate the approximate date such certification will be sought.**

<b>Contribution to certification</b>	Not Applicable
--------------------------------------	----------------

**Discuss the sources and extent of advice and consultation which have been used in formulating the course, including discussions with other departments and individual faculty members. Indicate whether any consultants have been contacted, especially those whose organizations enjoy widespread recognition in the field.**

<b>Sources/extent of advice and consultation</b>	The class was part of a proposal for a new Data Science undergraduate degree. This committee includes:  Carlos Coronel (Information Systems & Analytics), Dennis Walsh (Math), Don Hong, Qiang Wu, Joshua L. Phillips (Computer Science), Bud Fischer (Dean of Basic and Applied Sciences), Charlie Apigian (Information Systems & Analytics), Scott Seipel (Information Systems & Analytics), Yeqian Liu (Math), Lu Xion (Math), Ping Zhang (Math), Dong Ye (Math), Keith Gamble (Economics and Finance), John Wallin (Computational Science Ph.D.), Tim Greer (Information Systems & Analytics), Meda Sarkar (Computer Science), and Brian Hinote (Office of Student Success).
--	--

This class was also vetter by a group of Data Science professionals at a meeting on December 11, 2018. The curriuclum and new courses was given to them to review and at a lunch meeting in Nashville, they were able to give their feedback.

## Course Costs

For costs in addition to the existing budget generated by this course, project the estimated expenditures. Projected costs should include facilities, faculty, administration, library, research and teaching supplies, internship and clinical expenses, travel expenses, secretarial and technical assistance, computer assistance, and other related costs.

<b>Estimated expenditures</b>	None expected.
-------------------------------	----------------

Identify the sources of revenue which will be used to meet course costs (if other than normal sources of revenue), including amounts which are available or are expected to be available. Describe any special grants which may be sought to support this course. **NOTE: Course fees must be approved through a separate process.**

<b>Sources of revenue</b>	None expected
---------------------------	---------------

## Outline of Course Topics

The outline should reflect a concise and sequential listing of the content and concepts to be treated in the course.

<b>Course topics outline</b>	This outline goes through the machine learning process along with topics that are important to understand in Data Science.
------------------------------	--

### Introduction to Data Science

- What is Data Science
- What do Data Scientists do and the skills needed
- Identify all skills needed to become a Data Scientist
- How are corporations and other agencies using data

### Using the CRISP Model to work through a problem

- Business Understanding
  - Determining Business Objectives
  - Assessing the Situation
  - Determine Data Mining Goals
  - Producing a Project Plan

### Data Understanding

- Collect Data
- Describe Data
- Explore Data

### Data Preparation

- Select Data
- Clean Data
- Construct and Transform Data
- Integrate Data

- Modeling
  - Selecting Modeling Techniques
    - Unsupervised: Clustering, PCA, and Recommender Systems
    - Supervised: Classification and Regression
  - Generate Test Design
  - Building Models
  - Assess Models
- Evaluation
  - Evaluate the Results
  - Review Process
  - Determine Next Steps
- Deployment
  - Plan for deployment
  - Monitor and Maintain
  - Final Report

Other Topics:

- Ethics and Artificial Intelligence
- Industries using Big Data and Machine Learning
- The corporate environment with Data Science
- The place for DS teams in a corporation

### **Activities Possibly Required of Students**

Activities that could possibly be required of students should be listed. Activities might include readings, research or creative papers, class presentations, data collection, projects, creative products, interviews, field experiences, etc.

<b>Required student activities</b>	Students will be asked to read relevant papers, attend class, and discuss the concepts.
------------------------------------	---

Homework will consist of reviews of papers and textbook, but also guided problems through online tutorials. These will be created by Charles Apigian.

### **Proposed Evaluation Procedures**

Describe appropriate evaluation procedures that may be used to assess the degree of student achievement of course competencies. Do not list specific grade scales.

<b>Proposed evaluation procedures</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Applied HW (4 @ 75 pts. each)</td><td style="padding: 2px; text-align: right;">300</td></tr> <tr> <td style="padding: 2px;">In-class Assignments (5 @ 20 pts. each)</td><td style="padding: 2px; text-align: right;">100</td></tr> <tr> <td style="padding: 2px;">Data Science Project</td><td style="padding: 2px; text-align: right;">200</td></tr> <tr> <td style="padding: 2px;">Midterm</td><td style="padding: 2px; text-align: right;">150</td></tr> <tr> <td style="padding: 2px;">Final Exam</td><td style="padding: 2px; text-align: right;">250</td></tr> <tr> <td style="padding: 2px;"> </td><td style="padding: 2px; text-align: right;"> </td></tr> </table>	Applied HW (4 @ 75 pts. each)	300	In-class Assignments (5 @ 20 pts. each)	100	Data Science Project	200	Midterm	150	Final Exam	250		
Applied HW (4 @ 75 pts. each)	300												
In-class Assignments (5 @ 20 pts. each)	100												
Data Science Project	200												
Midterm	150												
Final Exam	250												

**Total****1000**

## References and Text

If a text will be used, provide one or more examples of possible texts. If readings or other materials will be used, provide a representative listing. If no text or readings will be used, explain why.

### References and text

Proposed text is:

A PRACTITIONER'S GUIDE TO BUSINESS ANALYTICS: Using Data Analysis Tools to Improve Your Organization's Decision Making and Strategy by Randy Bartlett. McGraw-Hill Education; 1 edition, **ISBN-10:** 0071807594 - **ISBN-13:** 978-0071807593.

Also required is the CRISP-DM Guide

- <ftp://public.dhe.ibm.com/software/analytics/spss/documentation/modeler/18.0/en/ModelerCRISPDM.pdf>

## Justification for Graduate Credit When a Course Is Dual Listed

Course outlines must demonstrate a substantive difference between undergraduate and graduate components when courses are dual listed. Decisions regarding graduate credit reside with the Graduate Council.

### Graduate credit justification

Not Applicable

## Comments

Please provide any other pertinent information not previously covered.

### Comments

New Prefix is **DATA**

We firmly believe that this will be a popular class that will allow students the ability to learn more about Data Science and get excited about its potential. With this course being cross-listed, it will also be a popular course for other majors and minors.

## Contact Information

**Department contact name\*** Charles Apigian

**Campus phone** 615-898-2375

**Campus email** charles.apigian@mtsu.edu

## Routing

### Select College and Curriculum Committee

**Select College and Curriculum Committee\***

- CBAS - Aerospace.
- CBAS - Agriculture.
- CBAS - Biology Undergraduate ^

Page 230

Academic Affairs, Student Life, and Athletics Committee

September 4, 2019 8/11

- CBAS - Biology Graduate \*
- CBAS - Chemistry.
- CBAS - Computer Science.
- CBAS - Concrete and Construction Management.
- CBAS - Engineering Technology.
- CBAS - Geosciences.
- CBAS - Mathematical Sciences Undergraduate ^
- CBAS - Mathematical Sciences Graduate \*
- CBAS - Military Science.
- CBAS - Physics and Astronomy.
- CBAS Other
- 
- CBHS - Criminal Justice Administration.
- CBHS - Health and Human Performance.
- CBHS - Health and Human Performance Graduate \*
- CBHS - Human Sciences.
- CBHS - Nursing.
- CBHS - Psychology Undergraduate ^
- CBHS - Psychology Graduate \*
- CBHS - Social Work Undergraduate ^
- CBHS - Social Work Graduate \*
- CBHS Other
- 
- JCB - Accounting Undergraduate ^
- JCB - Accounting Graduate \*
- JCB - Economics Undergraduate ^
- JCB - Economics Graduate \*
- JCB - Finance Undergraduate /
- JCB - Finance Graduate #
- JCB - Information Systems and Analytics Undergraduate ^
- JCB - Information Systems and Analytics Graduate \*
- JCB - Management.
- JCB - Marketing Undergraduate ^
- JCB - Marketing Graduate \*
- JCB - MBA Program.
- JCB Other
- 
- COE - Early Childhood #
- COE - K-5 Undergraduate ^
- COE - K-5 Graduate \*
- COE - Library Science.
- COE - Literacy (MEd) /
- COE - Literacy Studies (PhD).
- COE - Special Education (Interventionist and Comprehensive)
- COE - Educational Leadership - Teacher Education ^

- COE - Educational Leadership Graduate \*
- COE Other
- 
- CLA - Africana Studies.
- CLA - Art and Design.
- CLA - Communication Studies.
- CLA - English – Lower Division ^
- CLA - English – Upper Division #
- CLA - English – Graduate \*
- CLA - English – Online /
- CLA - Global Studies and Human Geography.
- CLA - History – General Education /
- CLA - History – Undergraduate ^
- CLA - History – Graduate \*
- CLA - History – Public History (MA) #
- CLA - Liberal Arts (MA).
- CLA - Music.
- CLA - Philosophy \*
- CLA - Religious Studies ^
- CLA - Political Science and International Relations.
- CLA - Anthropology #
- CLA - Sociology Undergraduate ^
- CLA - Sociology Graduate \*
- CLA - Theatre and Dance.
- CLA - World Languages, Literatures, and Cultures.
- CLA Other
- 
- CME - Journalism and Strategic Media.
- CME - Media and Communication (MS).
- CME - Media Arts.
- CME - Recording Industry.
- CME Other
- 
- UC - University Studies.
- UC Other
- 
- XYZ - ABC Academic Department.

---

**PROVOST OFFICE USE ONLY**

<b>GC/UCC approval</b> March 22, 2019 UCC date
--

AP modified 8/15/18

# DATA - 3550 - Applied Predictive Modeling

**zNew Course/Course Reactivation v. 2.0**

## General Information

### Instructions

**TURN ON** help text before starting this proposal by clicking  in the top right corner of the heading.

**FILL IN** all fields required marked with an \*. You will not be able to launch the proposal without completing required fields.

**CLICK ON Save All Changes** after each section.

**LAUNCH** proposal by clicking  in the top left corner.

**NAVIGATE** to the top right side of the page and click on  within the Proposal Toolbox (once proposed changes are made) to **move** the Proposal forward.

New Course/ Reactivation*	<input checked="" type="radio"/> New course <input type="radio"/> Course reactivation
------------------------------	--

Department/ College*	College of Basic and Applied Sciences
-------------------------	---------------------------------------

Effective term	Summer 2019
----------------	-------------

Course type*	Data Science
--------------	--------------

Course prefix*	DATA	Course no.* 3550
----------------	------	------------------

Full course title (100 characters only)*	Applied Predictive Modeling
--	-----------------------------

Abbreviated course title (30 characters only)*	Predictive Modeling
--	---------------------

Credit hours* 3	Contact hours (if different)
<b>Grading*</b> <input checked="" type="radio"/> Standard <input type="radio"/> Pass/Fail	
<b>Repeatable for additional credit*</b> <input type="radio"/> Yes <input checked="" type="radio"/> No	
If yes, number of repeats	OR total hours
Schedule type* <input type="radio"/> Lecture (LEC)	
Instructional method* <input type="radio"/> Conventional Methodology (CON)	
6-digit CIP Code <input type="radio"/> Data Model/Warehous DB Admin (110802)	

**NOTE: The prescribed requirement (below) is for lower-division courses (1000-2000 level) that will require completion of prescribed requirements (k courses).**

Prescribed requirement	<input type="checkbox"/> Writing <input type="checkbox"/> Reading <input type="checkbox"/> Math
------------------------	---

**NOTE: If the proposed course is to be crosslisted, a New Course Approval form must be filled out for both courses. If you do not submit a New Course Approval form for the crosslisted course, it will not be created.**

Cross listed/ Dual listed?** <input checked="" type="radio"/> Yes <input type="radio"/> No
Course to be cross listed/ dual listed STAT 3550

<b>General Education</b>
Is this course being proposed for General Education credit?* <input type="radio"/> Yes <input checked="" type="radio"/> No

If yes, the appropriate General Education form must be attached.

See [http://www.mtsu.edu/gen\\_ed/submit.php](http://www.mtsu.edu/gen_ed/submit.php).

Please attach any required files by navigating to the Proposal Toolbox and clicking  in the top right corner.

**Attached**  I have attached the corresponding General Education form.

## FOR GENERAL EDUCATION COURSES ONLY:

Complete Catalog Description in Course Information section below and then skip to Contact Information and Routing sections (bottom of form).

### Course Information

**NOTE: If this course will be used to meet degree requirements, a Program Change form must also be completed.**

#### Catalog Description

Most courses can be adequately described in fewer than forty words. The description should include main topics that are covered in the course, but a highly detailed listing of related topics does not belong in the catalog description. In general, complete sentences are not used.

**Catalog Description\*** An overview of the modeling process used in data science. Course covers the ethics involved in data science, data preprocessing, regression models, classification models, and presenting the model.

Describe any special admission and prerequisite requirements for the proposed new course.  
**Prerequisite grade requirements default to D- unless otherwise indicated.**

**Course prerequisites/ co-requisites/ restrictions** CSCI 1170

#### Course Description

Describe the course including clinical, internship, or other experiential components.

**Course description** An overview of the modeling process used in data science. Course covers the ethics involved in data science, data preprocessing, regression models, classification models, and presenting the model.

This is a traditional classroom-based course. Students will be expected to attend class regularly, do assigned homework, and complete a course project.

## Course Objectives

**Discuss the general and specific objectives of the course.**

### Course Objectives

Students will learn the basics of modeling using data to answer predictive questions from many walks of life. Ethics will be specifically covered, as will "soft skills" that would be useful in a consulting situation, such as writing and speaking in public.

The technical skills covered involve:

Pre-processing: Data cleaning, data transformations, deciding which variables are predictors

Regression: Linear and non-linear regression models and how to measure performance of the models.

Classification: Discriminant analysis and other linear classification models, nonlinear classification models, and how to measure performance.

## Course Justification

**Justify the course in terms of its uniqueness or distinctiveness and in terms of student needs.**

### Course justification

This course will be a required part of a proposed undergraduate degree in Data Science.

**Indicate the projected enrollment in the course and the probable source of students.**

### Projected enrollment

The feasibility study for the Data Science degree projected an initial student group of 70 students, and that the population would increase over the first five years. Before the degree program is approved, students in the statistics, computer science, or business intelligence and analytics majors may take this course.

**Describe how the proposed course relates to other courses in the departmental curricula and to the total educational curricula of the university.**

### Relation to departmental curricula

While there are courses in predictive modeling and predictive analytics at MTSU, they are at the graduate level and require prerequisites that are not reasonable to include in an undergraduate course.

**Justify any duplication. When new courses could legitimately be offered by a different department, consult with that department in advance and try to reach consensus regarding the appropriateness of the course.**

### Justify duplication and list departments consulted

The math, computer science, economics, and information systems and analytics departments were all represented at the meetings where this course was discussed.

**Indicate what contributions the course may make toward meeting service and research needs and to the overall efforts of the department, college, and university.**

**Research and service needs**

Data Science is an interdisciplinary area that is growing in importance to the business and science communities. The creation of an undergraduate program in this area will set MTSU apart since there are very few such programs nationwide right now. This course is a necessary piece of the degree, since it brings together several of the disparate ideas that are covered in the other required courses in a way that will allow students to experience the whole process of using data to make decisions.

**Course Integrity**

**Provide a list of faculty members who will teach the course and include pertinent information as to their qualifications. If anticipated growth will require additional faculty, indicate the number and general qualifications of such new faculty.**

**Faculty/ additional faculty**

This course can be taught by several faculty in the math department: Qiang Wu, Lu Xiong, Don Hong, Abdul Khaliq, Dennis Walsh, Ping Zhang, Lisa Green, Ginger Rowell, Yeqian Liu.

In addition, some faculty in the information systems and analytics department may also be able to teach it: Charles Apigian, Tim Greer. Computer science is also likely to have faculty who can teach this.

Finally, the program proposal for the undergraduate degree includes a budget that would allow for the hiring of new faculty members. The specific fields and qualifications of these new faculty have not been fully decided so far, but since this course is a basic one in the area, it is reasonable to assume that anyone hired into this program could teach this course.

**Discuss any special physical facilities needed to support the proposed new course, including the adequacy of classrooms, laboratories, teaching and research equipment, and offices.**

**Special physical facilities** N/A

**Indicate whether library collections and other learning resource materials are adequate to meet the needs of the course. If they are not, indicate what arrangements have been made to assure that these materials will be available when the new course is offered.**

**Learning resource materials**

The library already contains several books and journals that fit for this course. We may ask them to get a copy of the text book.

**If the course is in an area in which professional certification is available, explain how the course will contribute to certification. If the institution plans to seek new certification, indicate the approximate date such certification will be sought.**

**Contribution to certification** N/A

**Discuss the sources and extent of advice and consultation which have been used in formulating the course, including discussions with other departments and individual faculty members. Indicate whether any consultants have been contacted, especially those whose organizations enjoy widespread recognition in the field.**

**Sources/extent of advice and consultation** The math, computer science, economics, and information systems and analytics departments were all represented at the meetings where this course was discussed. In addition, several industry leaders have been consulted about the formation of the degree program and in a smaller way about this course.

### **Course Costs**

**For costs in addition to the existing budget generated by this course, project the estimated expenditures. Projected costs should include facilities, faculty, administration, library, research and teaching supplies, internship and clinical expenses, travel expenses, secretarial and technical assistance, computer assistance, and other related costs.**

**Estimated expenditures** n/a

**Identify the sources of revenue which will be used to meet course costs (if other than normal sources of revenue), including amounts which are available or are expected to be available. Describe any special grants which may be sought to support this course. NOTE: Course fees must be approved through a separate process.**

**Sources of revenue** n/a

### **Outline of Course Topics**

**The outline should reflect a concise and sequential listing of the content and concepts to be treated in the course.**

**Course topics outline**

- Ethics of the use of data in modeling
- A brief review of the predictive modeling process
- Data Pre-processing
  - Choice of predictors
  - Data types
  - Data cleaning
  - Missing data
  - Data transformations
- Regression Models
  - Measuring performance
  - Linear Regression

- Non-linear Regression
- Classification Models
- Measuring performance
- Discriminant Analysis and other Linear Classification Models
- Non-linear Classification Models

### Activities Possibly Required of Students

Activities that could possibly be required of students should be listed. Activities might include readings, research or creative papers, class presentations, data collection, projects, creative products, interviews, field experiences, etc.

<b>Required student activities</b>	Attending class regularly, homework, a class project with a class presentation. The class project and homework may require computer programming.
------------------------------------	--

### Proposed Evaluation Procedures

Describe appropriate evaluation procedures that may be used to assess the degree of student achievement of course competencies. Do not list specific grade scales.

<b>Proposed evaluation procedures</b>	Student grades will be based on homework, tests, and project grades.
---------------------------------------	--

### References and Text

If a text will be used, provide one or more examples of possible texts. If readings or other materials will be used, provide a representative listing. If no text or readings will be used, explain why.

<b>References and text</b>	There are several books in the area. One in particular that is reasonable is Applied Predictive Modeling By Max Kuhn and Kjell Johnson.
----------------------------	---

### Justification for Graduate Credit When a Course Is Dual Listed

Course outlines must demonstrate a substantive difference between undergraduate and graduate components when courses are dual listed. Decisions regarding graduate credit reside with the Graduate Council.

<b>Graduate credit justification</b>	n/a
--------------------------------------	-----

### Comments

Please provide any other pertinent information not previously covered.

**Comments** n/a

## Contact Information

**Department contact name\*** Lisa Green**Campus phone** 898-2608**Campus email** lisa.green@mtsu.edu

## Routing

### Select College and Curriculum Committee

**Select College and Curriculum Committee\***

- CBAS - Aerospace.
- CBAS - Agriculture.
- CBAS - Biology Undergraduate ^
- CBAS - Biology Graduate \*
- CBAS - Chemistry.
- CBAS - Computer Science.
- CBAS - Concrete and Construction Management.
- CBAS - Engineering Technology.
- CBAS - Geosciences.
- CBAS - Mathematical Sciences Undergraduate ^
- CBAS - Mathematical Sciences Graduate \*
- CBAS - Military Science.
- CBAS - Physics and Astronomy.
- CBAS Other
- 
- CBHS - Criminal Justice Administration.
- CBHS - Health and Human Performance.
- CBHS - Health and Human Performance Graduate \*
- CBHS - Human Sciences.
- CBHS - Nursing.
- CBHS - Psychology Undergraduate ^
- CBHS - Psychology Graduate \*
- CBHS - Social Work Undergraduate ^
- CBHS - Social Work Graduate \*
- CBHS Other
- 
- JCB - Accounting Undergraduate ^

- JCB - Accounting Graduate \*
- JCB - Economics Undergraduate ^
- JCB - Economics Graduate \*
- JCB - Finance Undergraduate /
- JCB - Finance Graduate #
- JCB - Information Systems and Analytics Undergraduate ^
- JCB - Information Systems and Analytics Graduate \*
- JCB - Management.
- JCB - Marketing Undergraduate ^
- JCB - Marketing Graduate \*
- JCB - MBA Program.
- JCB Other
- 
- COE - Early Childhood #
- COE - K-5 Undergraduate ^
- COE - K-5 Graduate \*
- COE - Library Science.
- COE - Literacy (MEd) /
- COE - Literacy Studies (PhD).
- COE - Special Education (Interventionist and Comprehensive)
- COE - Educational Leadership - Teacher Education ^
- COE - Educational Leadership Graduate \*
- COE Other
- 
- CLA - Africana Studies.
- CLA - Art and Design.
- CLA - Communication Studies.
- CLA - English – Lower Division ^
- CLA - English – Upper Division #
- CLA - English – Graduate \*
- CLA - English – Online /
- CLA - Global Studies and Human Geography.
- CLA - History – General Education /
- CLA - History – Undergraduate ^
- CLA - History – Graduate \*
- CLA - History – Public History (MA) #
- CLA - Liberal Arts (MA).
- CLA - Music.
- CLA - Philosophy \*
- CLA - Religious Studies ^
- CLA - Political Science and International Relations

- CLA - Anthropology #
- CLA - Sociology Undergraduate ^
- CLA - Sociology Graduate \*
- CLA - Theatre and Dance.
- CLA - World Languages, Literatures, and Cultures.
- CLA Other
- 
- CME - Journalism and Strategic Media.
- CME - Media and Communication (MS).
- CME - Media Arts.
- CME - Recording Industry.
- CME Other
- 
- UC - University Studies.
- UC Other
- 
- XYZ - ABC Academic Department.

---

**PROVOST OFFICE USE ONLY**

**GC/UCC approval** March 22, 2019 UCC  
**date**

AP modified 8/15/18

# STAT - 4700 - Analysis of Large-Scale Data Sets

Z\_2018-19 New Course/Course Reactivation

## General Information

## Instructions

**TURN ON** help text before starting this proposal by clicking  in the top right corner of the heading.

**FILL IN** all fields required marked with an \*. You will not be able to launch the proposal without completing required fields.

**CLICK ON Save All Changes** after each section.

**LAUNCH** proposal by clicking  in the top left corner.

**NAVIGATE** to the top right side of the page and click on  within the Proposal Toolbox (once proposed changes are made) to **move** the Proposal forward.

New Course/ Reactivation*	<input checked="" type="radio"/> New course <input type="radio"/> Course reactivation
------------------------------	--

Department/ College*	Mathematical Sciences
-------------------------	-----------------------

Effective term	Spring 2019
----------------	-------------

Course type*	Statistics
--------------	------------

Course prefix*	STAT	Course no.* 4700
----------------	------	------------------

Full course title (100 characters only)*	Analysis of Large-Scale Data Sets
--	-----------------------------------

Abbreviated course title (30 characters only)*	Large-Scale Data
--	------------------

Credit hours* 3	Contact hours (if different)
<b>Grading*</b> <input checked="" type="radio"/> Standard <input type="radio"/> Pass/Fail	
<b>Repeatable for additional credit*</b> <input type="radio"/> Yes <input checked="" type="radio"/> No	
If yes, number of repeats	OR total hours
Schedule type* LEC - Lecture	
Instructional method* CON - Conventional Methodology	
6-digit CIP Code Statistics (270501)	

**NOTE: The prescribed requirement is for lower-division courses (1000-2000 level) that will require completion of prescribed requirements (k courses).**

Prescribed requirement	<input type="checkbox"/> Writing <input type="checkbox"/> Reading <input type="checkbox"/> Math
------------------------	---

**NOTE: If the proposed course is to be crosslisted, a New Course Approval form must be filled out for both courses. If you do not submit a New Course Approval form for the crosslisted course, it will not be created.**

Crosslisted?** <input checked="" type="radio"/> Yes <input type="radio"/> No
Course to be cross listed STAT 5700 (dual listed with STAT 4700)

<b>General Education</b>
Is this course being proposed for General Education credit?* <input type="radio"/> Yes <input checked="" type="radio"/> No

If yes, the appropriate General Education form must be attached.

See [http://www.mtsu.edu/gen\\_ed/submit.php](http://www.mtsu.edu/gen_ed/submit.php).

Please attach any required files by navigating to the Proposal Toolbox and clicking  in the top right corner.

Attached	Page 244
	Academic Affairs, Student Life, and Athletics Committee
	September 4, 2019 2/10

I have attached the corresponding General Education form.

**FOR GENERAL EDUCATION COURSES ONLY: Complete Catalog Description in Course Information section below and then skip to Contact Information and Routing sections (bottom of form).**

## Course Information

**NOTE: If this course will be used to meet degree requirements, a Program Change form must also be completed.**

### Catalog Description

Most courses can be adequately described in fewer than forty words. The description should include main topics that are covered in the course, but a highly detailed listing of related topics does not belong in the catalog description. In general, complete sentences are not used.

**Catalog Description\*** The analysis and applications of large-scale data sets. Scalable machine learning and data mining applications in a practical clinical environment. Statistical software will be used in the application of these techniques.

**Describe any special admission and prerequisite requirements for the proposed new course.**

**Prerequisite grade requirements default to D- unless otherwise indicated.**

**Course prerequisites/ co-requisites/ restrictions** CSCI 1170 and either MATH 2530 or permission of the instructor.

### Course Description

**Describe the course including clinical, internship, or other experiential components.**

**Course description** This course is an introduction to the types of data sets obtained, for example, from web and social media; from machine-to-machine generation of data; from biometric data; from human-generated data; and genomic data.

Algorithms used in the analysis of this type of data will be covered. Students will use the R statistical software to analyze sample data sets.

### Course Objectives

**Discuss the general and specific objectives of the course.**

**Course Objectives** Data science plays an important role in many industries. In facing massive amount of heterogeneous data, scalable machine learning and data mining

Page 245  
Academic Affairs, Student Life, and Athletics Committee

September 4, 2019 3/10

algorithms and systems become extremely important for data scientists. The growth of volume, complexity and speed in data drives the need for scalable data analytic algorithms and systems. In this course, we study such algorithms and systems especially in the context of healthcare applications.

The large size and complexity of these datasets present great challenges in analyses and subsequent applications. In this course, we introduce the characteristics of this data and associated data mining challenges on dealing with such data. We cover various algorithms and systems for big data analytics and its applications.

### **Course Justification**

**Justify the course in terms of its uniqueness or distinctiveness and in terms of student needs.**

<b>Course justification</b>	The statistics major currently does not have a course similar to this one. But big data is an important use of statistics, one that employers are looking for.
-----------------------------	--

**Indicate the projected enrollment in the course and the probable source of students.**

<b>Projected enrollment</b>	This course will be offered mainly to majors in the statistics concentration, but it is feasible that students from other majors and departments such as actuarial science, computer science, business, or biology might be interested. The course will serve about 15 students per semester.
-----------------------------	---

**Describe how the proposed course relates to other courses in the departmental curricula and to the total educational curricula of the university.**

<b>Relation to departmental curricula</b>	In the mathematical sciences department, we currently have courses on Biostatistical Methods; Advanced Statistical Methods; Computational Statistics; and SAS Programming. Each of these courses contains a small part of the course content proposed for this course, but none of them contains all of it, and none of them address the key question of how to handle very large data sets.
---	--

**Justify any duplication. When new courses could legitimately be offered by a different department, consult with that department in advance and try to reach consensus regarding the appropriateness of the course.**

<b>Justify duplication and list departments consulted</b>	The computer science department offers some courses with similar content, such as Artificial Intelligence; Image Processing; Intelligent Data Analysis; Cloud Computing; Advanced Algorithms; Pattern Recognition; and Data Warehouse Design. However, the proposed course looks at big data from a statistical viewpoint and collects ideas related to the analysis of big data sets in one course.
---	--

**Indicate what contributions the course may make toward meeting service and research needs and to the overall efforts of the department, college, and university.**

**Research and service needs**

The main contribution that this course makes is to better prepare our statistics majors for the careers they will have after graduation.

**Course Integrity**

Provide a list of faculty members who will teach the course and include pertinent information as to their qualifications. If anticipated growth will require additional faculty, indicate the number and general qualifications of such new faculty.

**Faculty/ additional faculty**

This course would mainly be taught by Dr. Yeqian Liu or Dr. Ping Zhang. Also qualified are Dr. Dennis Walsh, Dr. Lisa Green, Dr. Ginger Rowell, Dr. Qiang Wu, and Dr. Don Hong.

**Discuss any special physical facilities needed to support the proposed new course, including the adequacy of classrooms, laboratories, teaching and research equipment, and offices.**

**Special physical facilities**

No new facilities needed.

Indicate whether library collections and other learning resource materials are adequate to meet the needs of the course. If they are not, indicate what arrangements have been made to assure that these materials will be available when the new course is offered.

**Learning resource materials**

The library has a copy of the main textbook that will be used for this course, and has online access to several ebooks on the subject.

If the course is in an area in which professional certification is available, explain how the course will contribute to certification. If the institution plans to seek new certification, indicate the approximate date such certification will be sought.

**Contribution to certification**

n/a

**Discuss the sources and extent of advice and consultation which have been used in formulating the course, including discussions with other departments and individual faculty members. Indicate whether any consultants have been contacted, especially those whose organizations enjoy widespread recognition in the field.**

**Sources/extent of advice and consultation**

The members of the statistics faculty have extensively discussed this course. Two members of the faculty have referred to other universities to see what they cover in a similar course.

**Course Costs**

For costs in addition to the existing budget generated by this course, project the estimated expenditures. Projected costs should include facilities, faculty, administration, library, research and teaching supplies, internship and clinical expenses, travel expenses, secretarial and technical assistance, computer assistance, and other related costs.

<b>Estimated expenditures</b>	There will be no significant costs, the data sets that will be used are available free.
-------------------------------	---

**Identify the sources of revenue which will be used to meet course costs (if other than normal sources of revenue), including amounts which are available or are expected to be available.**  
**Describe any special grants which may be sought to support this course. NOTE: Course fees must be approved through a separate process.**

<b>Sources of revenue</b>	n/a
---------------------------	-----

## Outline of Course Topics

The outline should reflect a concise and sequential listing of the content and concepts to be treated in the course.

<b>Course topics outline</b>	<p>This course introduces new statistical methods and computational tools for analyzing Big Data. This course covers the following topics:</p> <ol style="list-style-type: none"> <li>1. Introduction of Statistical challenges of Big Data Analysis <ul style="list-style-type: none"> <li>• Heterogeneity vs. Commonality</li> <li>• Challenges of massive data</li> <li>• Challenges of high dimensional data</li> <li>• Challenges of complex and noisy data</li> </ul> </li> <li>2. Handling massive data: divide-and-conquer statistical inference <ul style="list-style-type: none"> <li>• Introduction of MapReduce framework</li> <li>• Divide-and-conquer approach for statistical estimation and inference</li> <li>• Cluster Analysis: Hyerarchical Clustering and K-means Clustering (centroid based)</li> <li>• Random Forests, Boosting</li> <li>• Neural Networks</li> </ul> </li> <li>3. Handling high dimensional data: regularization method <ul style="list-style-type: none"> <li>• Introduction of regularization framework</li> <li>• Shrinkage Methods: Ridge Regression, LASSO, Elastic Net, OSCAR, etc.</li> <li>• Dimension Reduction Methods: sparse covariance estimation, PCA, PLS</li> <li>• Support Vector Machines</li> <li>• Undirected Graphical Models</li> </ul> </li> <li>4. Handling complex and noisy data: robust semiparametric method <ul style="list-style-type: none"> <li>• A new perspective on the roles of Gaussianity and linearity in multivariate analysis</li> <li>• Relaxing Gaussianity: transelliptical modeling and regularized rank based methods</li> </ul> </li> </ol>
------------------------------	--

- Relaxing Linearity: sparse additive modeling and semiparametric GLMs
- New applications: Semiparametric topic models, missing values in GLMs, semiparametric portfolio selection

### 5. Large-scale statistical optimization: model-based optimization

- Parametric simplex method
- Douglas-Rachford operator splitting method (or ADMM method)
- Peaceman-Rachford operator splitting method
- Statistical optimization for large-scale nonconvex optimization
- Tradeoff computation and statistics

R packages related to those topics will be introduced.

### **Activities Possibly Required of Students**

Activities that could possibly be required of students should be listed. Activities might include readings, research or creative papers, class presentations, data collection, projects, creative products, interviews, field experiences, etc.

#### **Required student activities**

Students will be expected to attend class, do homework, and take exams. Students will also be asked to do a semester-long data analysis project, including writing a consultant's report.

### **Proposed Evaluation Procedures**

Describe appropriate evaluation procedures that may be used to assess the degree of student achievement of course competencies. Do not list specific grade scales.

#### **Proposed evaluation procedures**

Grading will be based on the usual letter grade system.

### **References and Text**

If a text will be used, provide one or more examples of possible texts. If readings or other materials will be used, provide a representative listing. If no text or readings will be used, explain why.

#### **References and text**

An Introduction to Statistical Learning with Applications in R, Gareth James et. al. Springer. 2013.

Advanced Statistical Methods for the Analysis of Large Data-Sets. Di Ciaccio, et. al. Springer 2012.

Advanced Statistical Methods in Data Science. Chen, D. G. Springer. 2016.

### **Justification for Graduate Credit When a Course Is Dual Listed**

Page 249

Academic Affairs, Student Life, and Athletics Committee

September 4, 2019 7/10

**Course outlines must demonstrate a substantive difference between undergraduate and graduate components when courses are dual listed. Decisions regarding graduate credit reside with the Graduate Council.**

**Graduate credit justification**

This course will be dual listed with STAT 5700. Undergraduates will be expected to learn how to analyze big data sets and complete a data analysis project. Graduate students will be expected to do the same work as the undergraduates and in addition they will be expected to be able to read and summarize current research papers in the area.

**Comments**

Please provide any other pertinent information not previously covered.

**Comments**
**Contact Information**

**Department contact name\*** Lisa Green

**Campus phone** 615-898-5775

**Campus email** lisa.green@mtsu.edu

**Routing**
**Select College and Curriculum Committee**

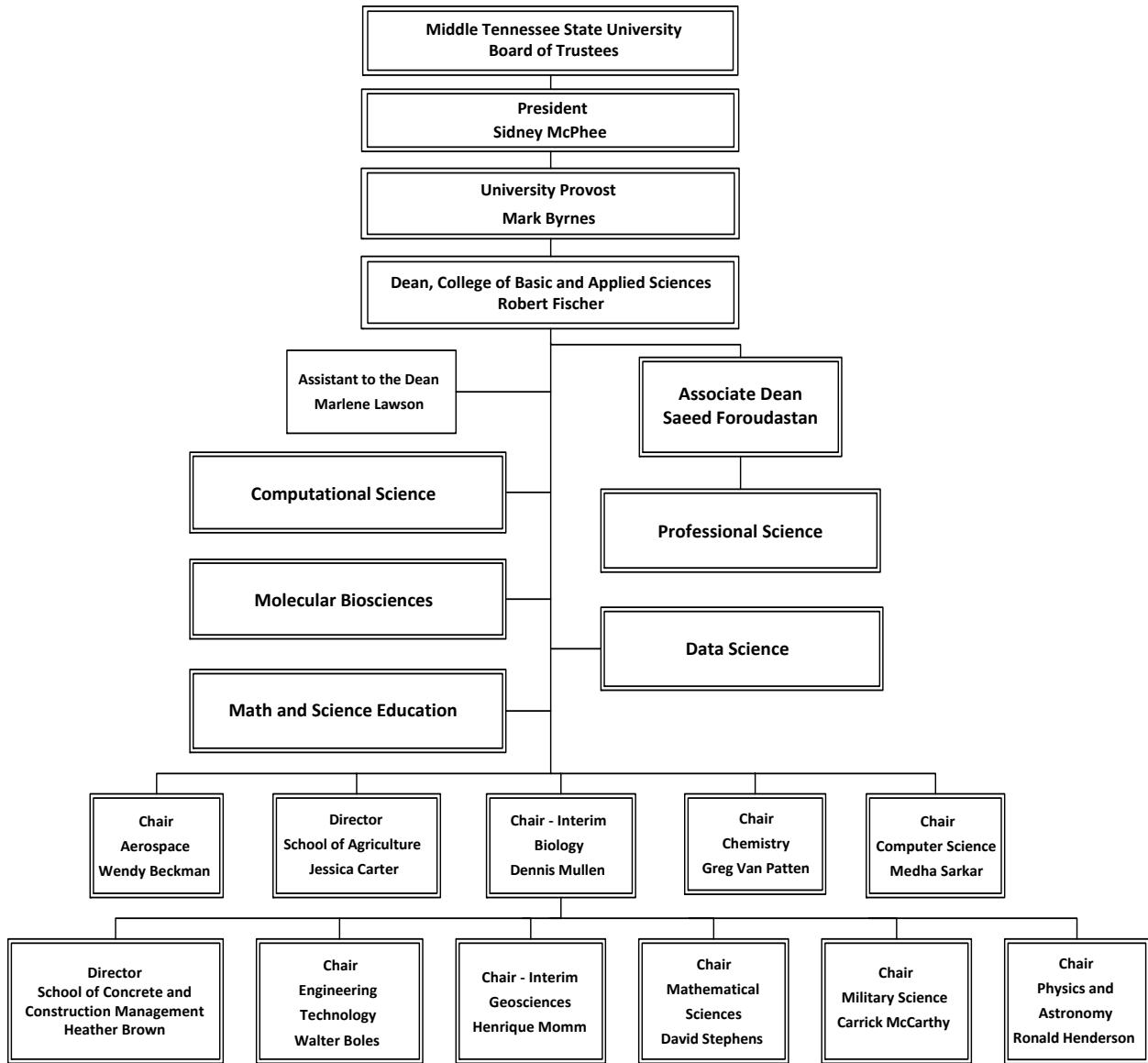
**Select College and Curriculum Committee\***

- CBAS - Aerospace.
- CBAS - Agribusiness and Agriscience.
- CBAS - Biology Undergraduate ^
- CBAS - Biology Graduate \*
- CBAS - Chemistry.
- CBAS - Computer Science.
- CBAS - Concrete and Construction Management.
- CBAS - Engineering Technology.
- CBAS - Geosciences.
- CBAS - Mathematical Sciences Undergraduate ^
- CBAS - Mathematical Sciences Graduate \*
- CBAS - Military Science.
- CBAS - Physics and Astronomy.
- CBAS Other
- 
- CBHS - Criminal Justice Administration

- CBHS - Health and Human Performance.
- CBHS - Human Sciences.
- CBHS - Nursing.
- CBHS - Psychology Undergraduate ^
- CBHS - Psychology Graduate \*
- CBHS - Social Work Undergraduate ^
- CBHS - Social Work Graduate \*
- CBHS Other
- 
- JCB - Accounting Undergraduate ^
- JCB - Accounting Graduate \*
- JCB - Computer Information Systems Undergraduate ^
- JCB - Computer Information Systems Graduate \*
- JCB - Economics Undergraduate ^
- JCB - Economics Graduate \*
- JCB - Finance Undergraduate /
- JCB - Finance Graduate #
- JCB - Management.
- JCB - Marketing Undergraduate ^
- JCB - Marketing Graduate \*
- JCB - MBA Program.
- JCB Other
- 
- COE - Early Childhood #
- COE - K-5 Undergraduate ^
- COE - K-5 Graduate \*
- COE - Library Science.
- COE - Literacy (MEd) /
- COE - Literacy Studies (PhD).
- COE - Special Education (Interventionist and Comprehensive)
- COE - Educational Leadership - Teacher Education ^
- COE - Educational Leadership Graduate \*
- COE Other
- 
- CLA - Africana Studies.
- CLA - Art and Design.
- CLA - Communication Studies and Organizational Communication.
- CLA - English – Lower Division ^
- CLA - English – Upper Division #
- CLA - English – Graduate \*
- CLA - English – Online /

- CLA - Foreign Languages and Literatures.
- CLA - Global Studies and Human Geography.
- CLA - History – General Education /
- CLA - History – Undergraduate ^
- CLA - History – Graduate \*
- CLA - History – Public History (MA) #
- CLA - Liberal Arts (MA).
- CLA - Music.
- CLA - Philosophy \*
- CLA - Religious Studies ^
- CLA - Political Science and International Relations.
- CLA - Anthropology #
- CLA - Sociology Undergraduate ^
- CLA - Sociology Graduate \*
- CLA - Theatre and Dance.
- CLA Other
- 
- CME - Journalism.
- CME - Media and Communication (MS).
- CME - Media Arts.
- CME - Recording Industry.
- CME Other
- 
- UC - University Studies.
- UC Other
- 
- XYZ - ABC Academic Department.

**MIDDLE TENNESSEE STATE UNIVERSITY  
COLLEGE OF BASIC AND APPLIED SCIENCES**







**Middle Tennessee State University  
Board of Trustees**

**Academic Affairs, Student Life, and Athletics Committee**

**Action Item**

DATE: September 4, 2019

SUBJECT: Approval of Policy Revision

PRESENTER: Mark Byrnes, Provost

---

**BACKGROUND INFORMATION:**

**Policy 501 Residency Classification**

The proposed changes reflect the new PC 80, which requires that universities classify the spouse or dependent child of a service member as in-state for tuition purposes if the service member is transferred out-of-state on military orders. Specific criteria are enumerated, including that the spouse or dependent had been accepted to the university; that he/she was initially classified as in-state prior to the transfer out-of-state; that he/she enrolled during the term initially accepted; and that he/she maintains continuous enrollment.





## 501 Residency Classification

Approved by Board of Trustees

Effective Date:                         , 2019

**Deleted:** August 15, 2019

Responsible Division: Student Affairs

Responsible Office: Enrollment Services

Responsible Officer: AVP Enrollment Services

### I. Purpose

It is the intent of Middle Tennessee State University (MTSU or University) that uniform criteria shall apply in determining whether students shall be classified in-state or out-of-state for tuition and fee purposes and for admission purposes. This policy provides the criteria that will be utilized in making classification determinations.

### II. Determination of Status

- A. Students and applicants with a domicile in Tennessee are to be classified in-state for tuition and fee purposes and for admission purposes. Domicile is a person's true, fixed, and permanent home and place of habitation; it is the place where he/she intends to remain, and to which he/she expects to return when he/she leaves MTSU without intending to establish a new domicile elsewhere.
  1. Persons eligible to establish domicile include U.S. citizens; valid/unexpired permanent residents; asylees/refugees; and those with certain visa types, including A1 – A3; E1, E2; G1 – G5; H1B, H4; I; K1 – K4; L1, L1a, L1b, L2; NATO 1 – NATO 7; O1, O3 (dependents of O1 only); P1 – P4; R1, R2; T1 – T4; and V.
  2. Persons not eligible to establish domicile include persons who have not met requirements of the Eligibility Verification for Entitlement Act (EVEA); undocumented persons, regardless of length of residence in Tennessee; persons on Deferred Action (DACA/Dream Act), and those with certain visa types, including B1, B2; C1 – C3; D1; F1, F2; H1C, H2A, H2B, H3; J1, J2; M1, M2; N; O2, O3 (dependents of O2); Q1 – Q3; S5 – S7; TC, TN, TD; and U1 – U5.
- B. Absence from Tennessee for short periods of time will not affect the establishment of a residence, provided domicile was not established in another state during that time.

- C. Students and applicants not having domicile in Tennessee shall be classified out-of-state.
- D. The domicile of an unemancipated person is that of his/her parent, except as provided in Section II.E. of this policy. Students who are unemancipated must submit parent, legal guardian, or foster parent documentation in lieu of their own. An emancipated person is one who has attained the age of eighteen (18) years, and whose parents have entirely legally surrendered the right to the care, custody, and earnings of such person and who no longer are under any legal obligation to support or maintain such deemed emancipated person.
- E. Unemancipated students of divorced parents shall be classified in-state when one (1) parent, regardless of custodial status, is domiciled in Tennessee.
- F. A student is classified in-state for tuition and fee purposes if the student is a citizen of the U.S. and has resided in Tennessee for at least one (1) year immediately prior to admission and meets one (1) of the following:
  - 1. Graduated from a Tennessee public secondary school;
  - 2. Graduated from a private secondary school that is located in Tennessee; or
  - 3. Earned a Tennessee high school equivalency diploma.
- G. The spouse of a student classified as in-state will also be classified as in-state.
- H. Regular full-time employees at institutions governed by the Tennessee Board of Regents (TBR) or a Locally Governed Institution (LGI), along with their spouses and children shall be classified as in-state students for purposes of fees and tuition when enrolled in courses at any TBR institution or LGI.
- I. Graduate assistants at MTSU shall be classified as in-state for purposes of fees and tuition.
- J. Continuous enrollment at MTSU is defined as enrollment in at least one (1) course in successive Fall or Spring terms during the student's enrollment.

### **III. Out-of-State Students who are Not Required to Pay Out-of-State Tuition**

- A. An unemancipated, currently enrolled student will be reclassified as out-of-state should his/her parent move out of the state of Tennessee. However, the student will not be required to pay out-of-state tuition nor be treated as an out-of-state student for admission purposes so long as he/she is continuously enrolled at MTSU.

- B. The waiver of out-of-state tuition granted to a student will follow the student from a Tennessee public community college to MTSU if the student transfers from the community college without a break in enrollment after successfully completing an associate's degree or if participating in a reverse transfer program.
- C. Students who participate in a study abroad program, when the course(s) in the study abroad program is/are the only course(s) for which the student is registered during that entire term are not required to pay out-of-state tuition.
- D. Dependent children who qualify and are selected to receive a scholarship because their parent is a law enforcement officer, fireman, or emergency medical service technician who was killed or totally and permanently disabled while performing duties within the scope of their employment are not required to pay out-of-state tuition. T.C.A. § 49-4-704.
- E. Military veterans who have a Tennessee address in Box 19A on their DD214 (mailing address after separation) will be charged in-state tuition and fees.
- F. A veteran or dependents eligible to receive educational benefits (to include the David Fry Scholarship) administered by the United States Department of Veterans Affairs, through any provision of the United States Code, shall not be required to pay out-of-state tuition and fees when the veteran or eligible dependent is:
  - 1. Enrolled at MTSU;
  - 2. Utilizing such benefits at MTSU; and
  - 3. Living in the state of Tennessee, regardless of the individual's formal state of residency.

If VA benefits run out/expire prior to graduation, a student can continue to qualify for in-state tuition and fees until completion of that degree, if he/she:

- a. Maintains continuous enrollment (Fall and Spring terms); and
- b. Demonstrates objective evidence of established residency in the state of Tennessee by presenting three (3) of the following:
  - (1) A Tennessee driver's license, issued for at least one (1) year;
  - (2) A Tennessee Identification Card, issued for at least one (1) year;
  - (3) Proof of a Tennessee voter's registration;

- (4) A Tennessee motor vehicle registration;
- (5) Proof of established employment in Tennessee;
- (6) Residential lease or mortgage.

Further, if the veteran or eligible dependent wishes to become a permanent resident, he/she can follow Steps a. and b. above and be recorded as an in-state resident.

- G. Individuals who join the Tennessee National Guard (active member) will be charged in-state tuition and fees.
- H. Military service members on active-duty orders who are stationed outside of the state of Tennessee but still maintain a Tennessee domicile will be charged in-state tuition and fees.
- I. An unemancipated person or spouse of an active-duty military member who is stationed outside of Tennessee but whose home of record is Tennessee, will be charged in-state tuition and fees (must show proof of domicile, including, but not limited to, driver's license, voter's registration, LES, tax document).
- J. An unemancipated person whose parent is not domiciled in Tennessee but is a member of the armed forces and stationed in Tennessee or at Fort Campbell, Kentucky pursuant to military orders will be classified out-of-state but shall not be required to pay out-of-state tuition. Such a person, while in continuous attendance toward the degree for which he/she is currently enrolled, will not be required to pay out-of-state tuition if his/her parent is transferred on military orders.
- K. Active-duty military personnel who begin working on a college degree at MTSU while stationed in Tennessee or at Fort Campbell, Kentucky, and who are transferred or deployed prior to completing their degree, can continue to completion of the degree at MTSU without being required to pay out-of-state tuition, as long as he/she completes at least one (1) course for credit each twelve (12)-month period after the transfer or deployment. Exceptions may be made in cases where the service member is deployed to an area of armed conflict for periods exceeding twelve (12) months.
- L. A spouse or dependent child of a service member who has been transferred out of the state of Tennessee on military orders will be classified as an in-state student for tuition purposes, if the spouse or dependent child: (1) Was accepted for admission to a public postsecondary institution; (2) Was initially classified by the institution that accepted the spouse or dependent child for admission as a Tennessee resident for tuition purposes; (3) Enrolls as a student in that institution for the academic term for which the spouse or dependent child was accepted for admission; and (4) Maintains continuous enrollment in that institution.

- M. Military personnel and their spouses stationed in Tennessee or at Fort Campbell, Kentucky who would be classified out-of-state in accordance with other provisions of this policy will be classified out-of-state but will not be required to pay out-of-state tuition. This does not apply to military personnel and their spouses who are stationed in Tennessee primarily for educational purposes.
- N. Pursuant to T.C.A. § 49-7-164, MTSU shall charge a dependent child under twenty-three (23) years of age, whose military parent dies as a result of a targeted attack that occurred in Tennessee, in-state tuition and fees regardless of the dependent child's domicile or place of residence during the dependent child's enrollment at MTSU, provided the dependent child has met and continues to meet all stated statutory requirements.
- O. Part-time students who are not domiciled in Tennessee but who are employed full-time in Tennessee, or who are stationed at Fort Campbell, Kentucky pursuant to military orders, shall be classified out-of-state but shall not be required to pay out-of-state tuition. This shall apply to part-time students who are employed in Tennessee by more than one (1) employer, resulting in the equivalent of full-time employment. Full-time employment is defined as working either one (1) job at a minimum of thirty-two (32) hours per week or more than one (1) part-time job to total an average of thirty-two (32) hours per week.
- O. Presumption. No person shall qualify for in-state fees if he/she came to Tennessee for the primary purpose of attending college. For example, if an individual moved to Tennessee and immediately enrolled at MTSU, another university, college, or community college as a full-time student, that person is presumed to have moved to Tennessee for the primary purpose of attending college and will not be eligible for in-state fees. The presumption is that a student cannot acquire domicile in Tennessee while enrolled as a full-time student.
- P. Evidence to be Considered for Establishment of Domicile. If a person asserts that he/she has established domicile in Tennessee, he/she has the burden of proving that he/she has done so. MTSU will consider any and all evidence provided concerning such claim of domicile. Generally, persons attempting to prove domicile should be prepared to offer multiple items of evidence including, but not limited to, proof of residence and/or property ownership within Tennessee; military orders assigning the person to Tennessee; proof of full-time employment within Tennessee; proof of receiving a Tennessee state benefit including, but not limited to, TennCare, TN Disability benefits, or SNAP; proof of current classification as in-state for tuition and fee purposes at another public Tennessee higher education institution; etc.

#### **IV. Appeal Procedure**

Individuals may appeal their initial classification of residency status for purposes of tuition and fee payment prior to the census date for the applicable term as specified on the registration calendar for each term according to the following procedure:

- A. Individuals who are initially classified as out-of-state for purposes of tuition and fee payment by personnel in the Admissions Office, the College of Graduate Studies, or the Office of International Admissions, and who wish to appeal this classification, must complete the Application for Tennessee Residency for Fee-Paying Purposes.
  1. Documentation submitted by the individual will be reviewed by the appropriate staff. The individual will be notified of any change in status or other action taken on his/her application. If the individual has an MTSU email account, he/she will be notified through this account. Otherwise, the individual will be notified using the information provided on the application. Notice to the individual of MTSU's decision is anticipated to be within five (5) business days, except during periods when a large volume of appeals has been filed, which may require extension of this notification period.
  2. In the event that the individual's application for in-state residency is denied, the individual will be advised to contact the Assistant Vice President for Student Affairs or designee to initiate an appeal of the classification.
- B. The Assistant Vice President for Student Affairs or designee will, upon request of the individual and receipt of any additional information required for full consideration, convene the Student Appeals Committee. A representative of the office of original classification in each individual case shall serve as a consultant to the Student Appeals Committee and, upon request, shall provide the basis for the original decision and any other relevant information.
- C. The Student Appeals Committee shall hear such evidence members regard as relevant to a proper review of the individual's residency status and will make a recommendation to the Vice President for Student Affairs either denying the appeal or recommending that the individual be reclassified as in-state for purposes of tuition and fee payment.
- D. The Vice President for Student Affairs will approve, reject, or modify the recommendation of the Student Appeals Committee. Notification to the individual of MTSU's decision is anticipated to be within five (5) business days, except during periods when a large volume of appeals has been filed, which may require extension of this notification period.
- E. The decision of the Vice President for Student Affairs will be final in matters of appeal with regard to residency status for purposes of tuition and fee payment.

**V. Effective Date for Reclassification**

- A. If a student classified out-of-state applies for in-state classification and is subsequently so classified, his/her in-state classification shall be effective as of the date on which reclassification was sought.
- B. However, out-of-state tuition will be charged for any semester during which reclassification is sought and obtained unless application for reclassification is made to the classification officer on or before the census day of that semester.

## VI. Regional Scholars

- A. The MTSU Regional Scholars Program allows select non-Tennessee resident students who live within a specified radius of the MTSU campus, as determined by the Board of Trustees and published on the [Regional Scholars website](#) and who meet specific academic requirements, to attend MTSU at a reduced rate.
- B. Though still classified as out-of-state, students who qualify will receive:
  1. A reduced tuition as determined by MTSU in accordance with approved guidelines.
  2. Consideration for institutional scholarships if admitted by the established scholarship deadlines.

Forms: none.

Revisions: June 5, 2017 (original); December 5, 2017; August 15, 2019;                         , 2019.

Last Reviewed: June 2019.

References: Tennessee Higher Education Commission Chapter 1540-1-1 Regulations for Classifying Persons as Tennessee Residents for the Purpose of Participating in Tennessee Higher Education Commission Programs Authority; Eligibility Verification for Entitlement Act; Deferred Action (DACA/Dream Act); T.C.A. §§ 49-4-704, 49-7-164.





## 501 Residency Classification

**Approved by Board of Trustees**

**Effective Date:** \_\_\_\_\_, 2019

**Responsible Division:** Student Affairs

**Responsible Office:** Enrollment Services

**Responsible Officer:** AVP Enrollment Services

### I. Purpose

It is the intent of Middle Tennessee State University (MTSU or University) that uniform criteria shall apply in determining whether students shall be classified in-state or out-of-state for tuition and fee purposes and for admission purposes. This policy provides the criteria that will be utilized in making classification determinations.

### II. Determination of Status

- A. Students and applicants with a domicile in Tennessee are to be classified in-state for tuition and fee purposes and for admission purposes. Domicile is a person's true, fixed, and permanent home and place of habitation; it is the place where he/she intends to remain, and to which he/she expects to return when he/she leaves MTSU without intending to establish a new domicile elsewhere.
  1. Persons eligible to establish domicile include U.S. citizens; valid/unexpired permanent residents; asylees/refugees; and those with certain visa types, including A1 – A3; E1, E2; G1 – G5; H1B, H4; I; K1 – K4; L1, L1a, L1b, L2; NATO 1 – NATO 7; O1, O3 (dependents of O1 only); P1 – P4; R1, R2; T1 – T4; and V.
  2. Persons not eligible to establish domicile include persons who have not met requirements of the Eligibility Verification for Entitlement Act (EVEA); undocumented persons, regardless of length of residence in Tennessee; persons on Deferred Action (DACA/Dream Act), and those with certain visa types, including B1, B2; C1 – C3; D1; F1, F2; H1C, H2A, H2B, H3; J1, J2; M1, M2; N; O2, O3 (dependents of O2); Q1 – Q3; S5 – S7; TC, TN, TD; and U1 – U5.
- B. Absence from Tennessee for short periods of time will not affect the establishment of a residence, provided domicile was not established in another state during that time.

- C. Students and applicants not having domicile in Tennessee shall be classified out-of-state.
- D. The domicile of an unemancipated person is that of his/her parent, except as provided in Section II.E. of this policy. Students who are unemancipated must submit parent, legal guardian, or foster parent documentation in lieu of their own. An emancipated person is one who has attained the age of eighteen (18) years, and whose parents have entirely legally surrendered the right to the care, custody, and earnings of such person and who no longer are under any legal obligation to support or maintain such deemed emancipated person.
- E. Unemancipated students of divorced parents shall be classified in-state when one (1) parent, regardless of custodial status, is domiciled in Tennessee.
- F. A student is classified in-state for tuition and fee purposes if the student is a citizen of the U.S. and has resided in Tennessee for at least one (1) year immediately prior to admission and meets one (1) of the following:
  - 1. Graduated from a Tennessee public secondary school;
  - 2. Graduated from a private secondary school that is located in Tennessee; or
  - 3. Earned a Tennessee high school equivalency diploma.
- G. The spouse of a student classified as in-state will also be classified as in-state.
- H. Regular full-time employees at institutions governed by the Tennessee Board of Regents (TBR) or a Locally Governed Institution (LGI), along with their spouses and children shall be classified as in-state students for purposes of fees and tuition when enrolled in courses at any TBR institution or LGI.
- I. Graduate assistants at MTSU shall be classified as in-state for purposes of fees and tuition.
- J. Continuous enrollment at MTSU is defined as enrollment in at least one (1) course in successive Fall or Spring terms during the student's enrollment.

### **III. Out-of-State Students who are Not Required to Pay Out-of-State Tuition**

- A. An unemancipated, currently enrolled student will be reclassified as out-of-state should his/her parent move out of the state of Tennessee. However, the student will not be required to pay out-of-state tuition nor be treated as an out-of-state student for admission purposes so long as he/she is continuously enrolled at MTSU.

- B. The waiver of out-of-state tuition granted to a student will follow the student from a Tennessee public community college to MTSU if the student transfers from the community college without a break in enrollment after successfully completing an associate's degree or if participating in a reverse transfer program.
- C. Students who participate in a study abroad program, when the course(s) in the study abroad program is/are the only course(s) for which the student is registered during that entire term are not required to pay out-of-state tuition.
- D. Dependent children who qualify and are selected to receive a scholarship because their parent is a law enforcement officer, fireman, or emergency medical service technician who was killed or totally and permanently disabled while performing duties within the scope of their employment are not required to pay out-of-state tuition. T.C.A. § 49-4-704.
- E. Military veterans who have a Tennessee address in Box 19A on their DD214 (mailing address after separation) will be charged in-state tuition and fees.
- F. A veteran or dependents eligible to receive educational benefits (to include the David Fry Scholarship) administered by the United States Department of Veterans Affairs, through any provision of the United States Code, shall not be required to pay out-of-state tuition and fees when the veteran or eligible dependent is:
  - 1. Enrolled at MTSU;
  - 2. Utilizing such benefits at MTSU; and
  - 3. Living in the state of Tennessee, regardless of the individual's formal state of residency.

If VA benefits run out/expire prior to graduation, a student can continue to qualify for in-state tuition and fees until completion of that degree, if he/she:

- a. Maintains continuous enrollment (Fall and Spring terms); and
- b. Demonstrates objective evidence of established residency in the state of Tennessee by presenting three (3) of the following:
  - (1) A Tennessee driver's license, issued for at least one (1) year;
  - (2) A Tennessee Identification Card, issued for at least one (1) year;
  - (3) Proof of a Tennessee voter's registration;

- (4) A Tennessee motor vehicle registration;
- (5) Proof of established employment in Tennessee;
- (6) Residential lease or mortgage.

Further, if the veteran or eligible dependent wishes to become a permanent resident, he/she can follow Steps a. and b. above and be recorded as an in-state resident.

- G. Individuals who join the Tennessee National Guard (active member) will be charged in-state tuition and fees.
- H. Military service members on active-duty orders who are stationed outside of the state of Tennessee but still maintain a Tennessee domicile will be charged in-state tuition and fees.
- I. An unemancipated person or spouse of an active-duty military member who is stationed outside of Tennessee but whose home of record is Tennessee, will be charged in-state tuition and fees (must show proof of domicile, including, but not limited to, driver's license, voter's registration, LES, tax document).
- J. An unemancipated person whose parent is not domiciled in Tennessee but is a member of the armed forces and stationed in Tennessee or at Fort Campbell, Kentucky pursuant to military orders will be classified out-of-state but shall not be required to pay out-of-state tuition. Such a person, while in continuous attendance toward the degree for which he/she is currently enrolled, will not be required to pay out-of-state tuition if his/her parent is transferred on military orders.
- K. Active-duty military personnel who begin working on a college degree at MTSU while stationed in Tennessee or at Fort Campbell, Kentucky, and who are transferred or deployed prior to completing their degree, can continue to completion of the degree at MTSU without being required to pay out-of-state tuition, as long as he/she completes at least one (1) course for credit each twelve (12)-month period after the transfer or deployment. Exceptions may be made in cases where the service member is deployed to an area of armed conflict for periods exceeding twelve (12) months.
- L. A spouse or dependent child of a service member who has been transferred out of the state of Tennessee on military orders will be classified as an in-state student for tuition purposes, if the spouse or dependent child: (1) Was accepted for admission to a public postsecondary institution; (2) Was initially classified by the institution that accepted the spouse or dependent child for admission as a Tennessee resident for tuition purposes; (3) Enrolls as a student in that institution for the academic term for which the spouse or dependent child was accepted for admission; and (4) Maintains continuous enrollment in that institution.

- M. Military personnel and their spouses stationed in Tennessee or at Fort Campbell, Kentucky who would be classified out-of-state in accordance with other provisions of this policy will be classified out-of-state but will not be required to pay out-of-state tuition. This does not apply to military personnel and their spouses who are stationed in Tennessee primarily for educational purposes.
- N. Pursuant to T.C.A. § 49-7-164, MTSU shall charge a dependent child under twenty-three (23) years of age, whose military parent dies as a result of a targeted attack that occurred in Tennessee, in-state tuition and fees regardless of the dependent child's domicile or place of residence during the dependent child's enrollment at MTSU, provided the dependent child has met and continues to meet all stated statutory requirements.
- O. Part-time students who are not domiciled in Tennessee but who are employed full-time in Tennessee, or who are stationed at Fort Campbell, Kentucky pursuant to military orders, shall be classified out-of-state but shall not be required to pay out-of-state tuition. This shall apply to part-time students who are employed in Tennessee by more than one (1) employer, resulting in the equivalent of full-time employment. Full-time employment is defined as working either one (1) job at a minimum of thirty-two (32) hours per week or more than one (1) part-time job to total an average of thirty-two (32) hours per week.
- O. Presumption. No person shall qualify for in-state fees if he/she came to Tennessee for the primary purpose of attending college. For example, if an individual moved to Tennessee and immediately enrolled at MTSU, another university, college, or community college as a full-time student, that person is presumed to have moved to Tennessee for the primary purpose of attending college and will not be eligible for in-state fees. The presumption is that a student cannot acquire domicile in Tennessee while enrolled as a full-time student.
- P. Evidence to be Considered for Establishment of Domicile. If a person asserts that he/she has established domicile in Tennessee, he/she has the burden of proving that he/she has done so. MTSU will consider any and all evidence provided concerning such claim of domicile. Generally, persons attempting to prove domicile should be prepared to offer multiple items of evidence including, but not limited to, proof of residence and/or property ownership within Tennessee; military orders assigning the person to Tennessee; proof of full-time employment within Tennessee; proof of receiving a Tennessee state benefit including, but not limited to, TennCare, TN Disability benefits, or SNAP; proof of current classification as in-state for tuition and fee purposes at another public Tennessee higher education institution; etc.

#### **IV. Appeal Procedure**

Individuals may appeal their initial classification of residency status for purposes of tuition and fee payment prior to the census date for the applicable term as specified on the registration calendar for each term according to the following procedure:

- A. Individuals who are initially classified as out-of-state for purposes of tuition and fee payment by personnel in the Admissions Office, the College of Graduate Studies, or the Office of International Admissions, and who wish to appeal this classification, must complete the Application for Tennessee Residency for Fee-Paying Purposes.
  1. Documentation submitted by the individual will be reviewed by the appropriate staff. The individual will be notified of any change in status or other action taken on his/her application. If the individual has an MTSU email account, he/she will be notified through this account. Otherwise, the individual will be notified using the information provided on the application. Notice to the individual of MTSU's decision is anticipated to be within five (5) business days, except during periods when a large volume of appeals has been filed, which may require extension of this notification period.
  2. In the event that the individual's application for in-state residency is denied, the individual will be advised to contact the Assistant Vice President for Student Affairs or designee to initiate an appeal of the classification.
- B. The Assistant Vice President for Student Affairs or designee will, upon request of the individual and receipt of any additional information required for full consideration, convene the Student Appeals Committee. A representative of the office of original classification in each individual case shall serve as a consultant to the Student Appeals Committee and, upon request, shall provide the basis for the original decision and any other relevant information.
- C. The Student Appeals Committee shall hear such evidence members regard as relevant to a proper review of the individual's residency status and will make a recommendation to the Vice President for Student Affairs either denying the appeal or recommending that the individual be reclassified as in-state for purposes of tuition and fee payment.
- D. The Vice President for Student Affairs will approve, reject, or modify the recommendation of the Student Appeals Committee. Notification to the individual of MTSU's decision is anticipated to be within five (5) business days, except during periods when a large volume of appeals has been filed, which may require extension of this notification period.
- E. The decision of the Vice President for Student Affairs will be final in matters of appeal with regard to residency status for purposes of tuition and fee payment.

## V. Effective Date for Reclassification

- A. If a student classified out-of-state applies for in-state classification and is subsequently so classified, his/her in-state classification shall be effective as of the date on which reclassification was sought.
- B. However, out-of-state tuition will be charged for any semester during which reclassification is sought and obtained unless application for reclassification is made to the classification officer on or before the census day of that semester.

## VI. Regional Scholars

- A. The MTSU Regional Scholars Program allows select non-Tennessee resident students who live within a specified radius of the MTSU campus, as determined by the Board of Trustees and published on the [Regional Scholars website](#) and who meet specific academic requirements, to attend MTSU at a reduced rate.
- B. Though still classified as out-of-state, students who qualify will receive:
  1. A reduced tuition as determined by MTSU in accordance with approved guidelines.
  2. Consideration for institutional scholarships if admitted by the established scholarship deadlines.

Forms: none.

Revisions: June 5, 2017 (original); December 5, 2017; August 15, 2019; \_\_\_\_\_, 2019.

Last Reviewed: June 2019.

References: Tennessee Higher Education Commission Chapter 1540-1-1 Regulations for Classifying Persons as Tennessee Residents for the Purpose of Participating in Tennessee Higher Education Commission Programs Authority; Eligibility Verification for Entitlement Act; Deferred Action (DACA/Dream Act); T.C.A. §§ 49-4-704, 49-7-164.



**Middle Tennessee State University  
Board of Trustees**

**Academic Affairs, Student Life, and Athletics Committee**

**Information Item**

DATE: September 4, 2019

SUBJECT: [Athletics Update](#)

PRESENTER: Chris Massaro  
Director of Athletics

---

**BACKGROUND INFORMATION:**

Department of Athletics update including ticket sales and the athletics facilities plan.