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

September 4, 2019
9:00 am
MEC Training Room – 2nd 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
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.
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 Burkhart, 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
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

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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

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 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.

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”. 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. 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, 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. So fast, in fact, that an accurate count is very difficult. The website “data science community” lists forty-three bachelors programs in data science. 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\(^8\). 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\(^9\).”

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.” 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. 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.” 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\(^1\). 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\(^2\). 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\(^3\). 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\(^4\).”

**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


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

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


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.

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<td>MATH 1910</td>
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<td>Data Analysis (R programming)</td>
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<td>Applied Statistics II</td>
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**Inferential Thinking**

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<td>STAT 4360 Regression Analysis</td>
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<td>STAT 4380 Experimental Design</td>
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<td>STAT 4700 Analysis of Large-Scale Data Sets</td>
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**Business Intelligence**

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<tr>
<td>BIA 4010 Business Analytics and Visualization</td>
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<td>BIA/INFS 3470 Python for Business Applications</td>
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<td>STAT 4700 Analysis of Large-Scale Data Sets</td>
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<td>INFS 4900 Business Data Communications</td>
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</tbody>
</table>

**Machine Learning**

<table>
<thead>
<tr>
<th>Required Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 3080 Discrete Structures</td>
</tr>
<tr>
<td>CSCI 3110 Algorithms and Data Structures</td>
</tr>
<tr>
<td>CSCI 4350 Introduction to Artificial Intelligence</td>
</tr>
<tr>
<td>CSCI 4850 Neural Networks</td>
</tr>
</tbody>
</table>

**Data Science Track Electives:**

*Students will complete Track requirements by selecting from the following or from courses in a different track*

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 3130 - Assembly and Computer Organization</td>
</tr>
<tr>
<td>CSCI 3240 - Introduction to Computer Systems</td>
</tr>
<tr>
<td>CSCI 4330 - Parallel Processing Concepts</td>
</tr>
<tr>
<td>ECON 2420 - Principles of Economics, Micro</td>
</tr>
<tr>
<td>ECON 4620 - Econometrics and Forecasting</td>
</tr>
<tr>
<td>STAT 4600 OR ACSI 4600</td>
</tr>
<tr>
<td>CSCI 4300 - Data Communication and Networks</td>
</tr>
<tr>
<td>DATA 4500 - Data Science Internship^B**</td>
</tr>
</tbody>
</table>

**Electives (A minor is strongly encouraged)**

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 credits</td>
</tr>
</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 credits</td>
</tr>
</tbody>
</table>

* This course also meets General Education requirements
** New courses specifically for the Data Science program
A Classes are either internship of independent study courses, which vary based on the project or internship.
B 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](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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Full-Time Headcount</th>
<th>Part-time Headcount</th>
<th>Total Year Headcount</th>
<th>FTE</th>
<th>Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>4</td>
<td>29</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>43</td>
<td>4</td>
<td>47</td>
<td>45</td>
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<tr>
<td>3</td>
<td>50</td>
<td>6</td>
<td>56</td>
<td>53</td>
<td>4</td>
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<tr>
<td>4</td>
<td>58</td>
<td>6</td>
<td>64</td>
<td>61</td>
<td>9</td>
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<tr>
<td>5</td>
<td>65</td>
<td>8</td>
<td>73</td>
<td>69</td>
<td>14</td>
</tr>
</tbody>
</table>
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.
### Anticipated Faculty

- **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 be 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.

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

### 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.

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

<table>
<thead>
<tr>
<th></th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition and Fees¹</td>
<td>$1,000,000.00</td>
<td>$326,534.00</td>
<td>$147,218.00</td>
<td>$83,554.64</td>
<td>$5,525.68</td>
<td>(6,280.83)</td>
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<tr>
<td>Institutional Reallocations²</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Federal Grants³</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Private Grants or Gifts⁴</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other⁵</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

**BALANCED BUDGET LINE**

<table>
<thead>
<tr>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,000,000.00</td>
<td>$580,550.00</td>
<td>$583,538.00</td>
<td>$611,434.64</td>
<td>$630,653.68</td>
<td>$722,359.17</td>
</tr>
</tbody>
</table>

**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.

2. 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.

4. No Federal grants are used to fund this degree.

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

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

7. Please provide information regarding other sources of the funding.

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

**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. Sys. & 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., and Murat Arik, Ph.D.

DECEMBER 2018

MIDDLE TENNESSEE STATE UNIVERSITY

JONES COLLEGE OF BUSINESS

Business and Economic Research Center
We evaluate the feasibility of offering a bachelor's 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.”¹ 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 bachelor's 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.² 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.³

**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

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³Please see appendix I for a list of these CIP codes.
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.\(^4\)

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\(^4\)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.\(^5\) So fast, in fact, that an accurate count is very difficult. The website “datascience community” lists forty-three bachelors programs in data science.\(^6\) 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.\(^7\) 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.\(^8\) The University of North Carolina/Charlotte

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\(^7\) 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.

\(^8\) http://www.facsen.iastate.edu/sites/default/files/uploads/17-18%20Docket%20Calendar/S17-6%20-
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."\(^9\)

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

\(^9\)\(\text{https://provost.uncc.edu/sites/provost.uncc.edu/files/media/LOI-Data-Science-BS.pdf}\)
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.\(^\text{10}\) 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.\(^\text{11}\) 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.\(^\text{12}\) 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.\(^\text{13}\) 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.”\(^\text{14}\)

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

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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.\(^\text{15}\) 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.”\(^\text{16}\) 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.

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\(^{15}\)“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).

\(^{16}\)[https://www.onetonline.org/search/hot_tech/#list_P](https://www.onetonline.org/search/hot_tech/#list_P)
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.” 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. 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.” 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.

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17Center for Economic Research in Tennessee, LEAP 2018 Occupational Analysis. Tennessee Department of Economic and Community Development.
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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.0104</td>
<td>Informatics</td>
</tr>
<tr>
<td>11.0401</td>
<td>Information Science/Studies</td>
</tr>
<tr>
<td>11.0501</td>
<td>Computer System Analysis/Analyst</td>
</tr>
<tr>
<td>11.0802</td>
<td>Data Modeling/Warehousing and Database Administration</td>
</tr>
<tr>
<td>27.0501</td>
<td>Statistics, General</td>
</tr>
<tr>
<td>27.0503</td>
<td>Mathematics and Statistics</td>
</tr>
<tr>
<td>30.3001</td>
<td>Computational Science</td>
</tr>
</tbody>
</table>

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.

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

Standard Occupational Classification Codes Used in this study:

<table>
<thead>
<tr>
<th>code</th>
<th>Title</th>
<th>detail</th>
<th>2016-26 Growth</th>
<th>Annual Openings</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-1141</td>
<td>Database Administrator</td>
<td></td>
<td>11.5%</td>
<td>9,300</td>
</tr>
<tr>
<td>15-1199</td>
<td>Computer Occupations (other)</td>
<td></td>
<td>9.3%</td>
<td>22,400</td>
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<tr>
<td>15-1199.06</td>
<td>Database Architects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-1199.07</td>
<td>Data Warehousing Specialists</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-1199.08</td>
<td>Business Intelligence Analysts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-2041</td>
<td>Statisticians</td>
<td></td>
<td>33.8%</td>
<td>4,400</td>
</tr>
<tr>
<td>15-2031</td>
<td>Operations Research Analysts</td>
<td></td>
<td>27.4%</td>
<td>10,700</td>
</tr>
</tbody>
</table>
### Appendix B-1 Sample Program of Study (Full-Time)

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

<table>
<thead>
<tr>
<th></th>
<th>Freshman</th>
<th></th>
<th>Sophomore</th>
<th></th>
<th>Junior</th>
<th></th>
<th>Senior</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
<td>Spring</td>
<td>Fall</td>
<td>Spring</td>
<td>Fall</td>
<td>Spring</td>
<td>Fall</td>
<td>Spring</td>
</tr>
<tr>
<td>HIST 2010, 2020 or 2030</td>
<td>3</td>
<td>COM 2200</td>
<td>Statistics</td>
<td>3</td>
<td>MATH 2530</td>
<td>3</td>
<td>CSCI 2170</td>
<td>4</td>
</tr>
<tr>
<td>MATH</td>
<td>3</td>
<td>HIST 2010, 2020 or 2030</td>
<td>3</td>
<td>DATA 1500</td>
<td>3</td>
<td>MATH 2110</td>
<td>1</td>
<td>BIA 3620/3621</td>
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<td>ENGL 1010</td>
<td>3</td>
<td>ENGL 1020</td>
<td>ENG 2020, 2030 or HUM 2610</td>
<td>3</td>
<td>CSCI 1170</td>
<td>4</td>
<td>DATA 3500</td>
<td>3</td>
</tr>
<tr>
<td>Hum/FA (Rubric 1)</td>
<td>3</td>
<td>MATH 1910</td>
<td>Nat. Sci. (Rubric 1)</td>
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<td>Soc/Beh Sci (Rubric 2)</td>
<td>3</td>
<td>DS Track</td>
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<tr>
<td>Hum/FA (Rubric 2)</td>
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<td>Soc/Beh Sci (Rubric 1)</td>
<td>ECON 2410</td>
<td>3</td>
<td>Nat. Sci. (Rubric 2)</td>
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<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Spring</th>
<th>Fall</th>
<th>Spring</th>
<th>Fall</th>
<th>Spring</th>
<th>Fall</th>
<th>Spring</th>
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</tbody>
</table>

**TOTAL = 120**

(* 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**

### Year One

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
<th>Summer</th>
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</thead>
<tbody>
<tr>
<td>HIST 2010, 2020, 2030</td>
<td>MATH 3</td>
<td>Soc/Beh Sciences (Rubric 1)</td>
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<tr>
<td>ENGL 1010</td>
<td>ENGL 1020</td>
<td>HIST 2010, 2020, 2030</td>
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### Year Two

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<th>Summer</th>
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</thead>
<tbody>
<tr>
<td>Hum/Fine Arts (Rubric 1)</td>
<td>MATH 3</td>
<td>Nat/Sci (Rubric 2)</td>
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<td>COMM 2200</td>
<td>MATH 1910</td>
<td>ECON 2410</td>
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### Year Three

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<th>Summer</th>
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</thead>
<tbody>
<tr>
<td>ENG 2020, 2030 or HUM 2610</td>
<td>CSCI 1170</td>
<td>DATA 3550</td>
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<tr>
<td>Soc/Beh Sciences (Rubric 2)</td>
<td>DATA 3500</td>
<td>MATH 2530</td>
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<tr>
<td>MATH 2110</td>
<td>BIA 3620/3621</td>
<td>DS Track</td>
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### Year Four

<table>
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<tr>
<th>Fall</th>
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<th>Summer</th>
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<tbody>
<tr>
<td>Major Core</td>
<td>Data Science Elective</td>
<td>Minor &amp; Electives</td>
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### Year Five

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<thead>
<tr>
<th>Fall</th>
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<th>Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS Track</td>
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<td>Elective (Minor)</td>
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</tbody>
</table>

### Year Six

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<tr>
<th>Fall</th>
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</tr>
<tr>
<td>Elective (Minor)</td>
<td>Elective (Minor)</td>
<td>Elective (Minor)</td>
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### Year Seven

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<th>Summer</th>
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<tbody>
<tr>
<td>Data 4950</td>
<td>DATA 4950</td>
<td>DS Elective</td>
</tr>
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</table>

**TOTAL = 120**
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

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

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,

Ralph Schulz  
President and CEO
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
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
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
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,

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.

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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,

Ralph Schulz
President and CEO
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 is job market right now. Equally, it will prevent companies from looking elsewhere, strengthening the vitality of the region for years to come.

Regards,

[Signature]
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,

K. Beth Duffield
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,  

[Signature]  

Matt Largen  
President & CEO
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 UNIVERSITY; Murfreesboro, TN
    Interim Director - Data Science Institute May 2018 - Present
    Chair - Information Systems and Analytics August 2013 – May 2018
    Professor - Information Systems and Analytics August 2002 - Present

MIDDLE TENNESSEE STATE UNIVERSITY; Murfreesboro, TN
    Academic Coordinator for the McNair Scholars Program August 2009 - 2011

UNIVERSITY OF TOLEDO; Toledo, OH
    Graduate Assistant August 2000 – May 2002

WORK EXPERIENCE:
KACE SERVICES, L.L.C. - Canton, MI
    Senior Consultant and Lead Assessor to Quality Systems January 2000 - 2002
(ex. ISO9001, ISO17025, etc.)

CONCORD PRECISION, INC.; Westland, MI
    Vice President May 1995 – December 2001
    Toolmaker Apprentice January 1990 – April 1995

SELECTED PUBLICATIONS:


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)
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 2nd 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
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


### CONFERENCE PROCEEDINGS


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

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 Adenholdt

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

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**


Technical Reports


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
- 9th Workshop on Resiliency in High Performance Computing (Resilience) in Clusters, Clouds, and Grids – 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
- 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

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  

RESEARCH

“Perspectives on ‘Cognitive Decline and Household Financial Decisions at Older Ages’” by Marco Angrisani and Jinkook Lee  


“Informed Short Selling around SEO Announcements”  
with Sanjay Deshmukh and Keith Howe,  

“Informed Retail Investors: Evidence from Retail Short Sales” with Wei Xu,  

“Aging and Financial Decision Making”  
with Patricia A. Boyle, Lei Yu, and David Bennett,  

“Short Selling and Firm Operating Performance”  

“How Prior Outcomes Affect Individual Investors’ Subsequent Risk Taking”  
“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?”

“Informed Local Trading Prior to Earnings Announcements”

“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
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  
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
Education
Ph. D.  Georgia Institute of Technology, Mathematics  2000
Atlanta GA
M. S.  Georgia Institute of Technology,  Applied Mathematics  1996
Atlanta GA
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


Teaching Experience

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).


**Presentations**


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.


**Grants**


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


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

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


Administrative Experience
Interim Chair, Mathematical Sciences Department. 2018-2019.


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  

**(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, Assistnt Professor, Mathematics, East Tennessee State University

**(c) Five Related Publications**


**Five Other Publications**

Synergistic Activities


• **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.


• **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
(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.
- 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.
- 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.
YEQIAN LIU
Phone:(501) 707-7993
Email: Yeqian.Liu@mtsu.edu

EDUCATION

• University of Missouri-Columbia
  Ph.D. in Statistics
  Columbia, MO
  2012 – 2016
  – Advisor: Dr. Tony (Jianguo) Sun

• University of Arkansas at Little Rock
  M.Sc in Mathematics
  Little Rock, AR
  2009-2011

• Beihang University
  B.Sc in Mathematics
  Beijing, China
  2004 – 2008

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

• Computer Skills
  – SAS, R/Splus, Matlab, Maple, C, Winbugs, C++, \LaTeX, SQL, Python

PROFESSIONAL EXPERIENCE

• Department of Mathematical Sciences, Middle Tennessee State University
  Assistant Professor
  Murfreesboro, TN
  2016 – present
  – 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
  Instructor & Teaching Assistant
  Columbia, MO
  2012 – 2016
  – Teaching Assistant: Advanced Survival Analysis (Fall 2014)

• Division of Biometrics and Data Management, Novartis Oncology
  Intern
  East Hanover, NJ
  Summer 2015
  – 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
Instructor & Teaching Assistant
Little Rock, AR 2009 – 2012
  – Teaching Assistant: Calculus I (Fall 2009), Calculus II (Spring 2010)

PUBLICATIONS


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

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 multicategory 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

EDUCATION

“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

M.S. — Computer Science Vanderbilt University 2002-2004
“Reinforcement Learning of Dimensional Attention for Categorization”
Directed by Dr. David Noelle. Read by Dr. Thomas Palmeri. GPA—3.96

B. S. — Computer Science Middle Tennessee State University 1998-2002
Minors in mathematics and physics. Graduated magna cum laude. GPA—3.78

PUBLICATIONS


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.


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


**INVITED TALKS**


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

Texas Christian University (TCU)  
Visiting Assistant Professor of Decision Sciences  
Department of Finance and Decision Sciences  
August 1999 to May 2000

University of Texas at Arlington (UTA)  
Visiting Assistant Professor of Information Systems  
Department of Information Systems and Management Science  
January 1999 to August 1999

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**


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

2. **Academic Appointments:**

   - **Associate Professor** July 2015 – Present
     Middle Tennessee State University, Department of Mathematical Sciences
     Computational Science PhD Program
   - **Assistant Professor** Aug. 2011– July 2015
     Middle Tennessee State University, Department of Mathematical Sciences
   - **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:**


   **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.


(4) Qiang Wu, Bias corrected regularization kernel network and its applications, in *2017 International Joint Conference on Neural Networks (IJCNN)*, pages 1072-1079.


(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.


**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 ans Qiang Wu, Online learning for supervised dimension reduction. 2018 preprint.


(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.


**Other Publications:**


(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.


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

» 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

- 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

- 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

- Actuarial consulting projects.
- Research in Captive insurance company financial health rating modeling.

» 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

Actuarial Exams passed
- SOA Exam P (CAS Exam 1) - Probability, passed in Nov 2010 (Candidate ID: 85534).
- SOA Exam C (CAS Exam 4/C) - Construction and Evaluation of Actuarial Models, passed in Feb 2013 (Candidate ID: 39325).
- VEE - Corporate Finance, VEE - Statistics, VEE - Microeconomics

Paper Submitted/Proceedings
Zhijiang Dong

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

Research Interest
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.

Education
Florida International University, Miami, FL
Ph.D in Computer Science Aug. 2006
Advisor: Xudong He

Huazhong University of Science & Technology Wuhan, P.R.China
M.S. in Computer Science June 1997
Thesis title: Semantic Inter-operation in Distributed Multimedia DBMS DM2
Advisor: Yucai Feng

Employment
Professor Aug. 2018 to present
Middle Tennessee State University, Murfreesboro, TN

Associate Professor Aug. 2012 to Aug. 2018
Middle Tennessee State University, Murfreesboro, TN

Assistant Professor Aug. 2006 to Aug. 2012
Middle Tennessee State University, Murfreesboro, TN

Graduate Assistant Aug. 2000 to Aug. 2005
Florida International University, Miami, FL

Grants


Refereed Publications


Technical Reports


Presentations


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 9Fall 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**


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
Online videos: 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 basics 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 prerequisite 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


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

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>900-1000</td>
<td>A</td>
</tr>
<tr>
<td>870 up to 900</td>
<td>B+</td>
</tr>
<tr>
<td>800 up to 870</td>
<td>B</td>
</tr>
<tr>
<td>770 up to 800</td>
<td>C+</td>
</tr>
<tr>
<td>700 up to 770</td>
<td>C</td>
</tr>
<tr>
<td>670 up to 700</td>
<td>D+</td>
</tr>
<tr>
<td>600 up to 670</td>
<td>D</td>
</tr>
<tr>
<td>Less than 600</td>
<td>F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of Assignments</th>
<th>Points Each</th>
<th>Total Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW Assignments through MindTap</td>
<td>Varies</td>
<td>Varies – see site and HW Doc</td>
<td>500</td>
</tr>
<tr>
<td>Exams</td>
<td>2</td>
<td>250</td>
<td>500</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1000</td>
</tr>
</tbody>
</table>

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, or contact the Financial Aid Office at 898-2830.
BIA 3620 – Introduction to Business Analytics Lecture

Professor: Dr. Scott J. Seipel
Class: Section 003  T 2:40 – 4:05pm  BAS S126
Section 004  M 4:10 – 5:35pm  BAS S126
Office and Hours: BAS N358  M 2:00-3:45pm  T 4:15-5:30pm  W 3:30-5:30pm
Phone: 616.898.2707 office
615.898.2362 (Information Systems and Analytics Dept.)
Email: Scott.Seipel@mtsu.edu
Textbooks: None required. Class will be supported with readings and videos that are directly linked via the course D2L website.
Other Materials: 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:
  o 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
  o You will learn how data is acquired, stored, managed, governed, and retrieved for analysis
  o You will understand how data can be transformed into useful and actionable information
  o You will understand how performance is measured and how key performance indicators are formed from business measures
  o You will consider, evaluate, and apply the underlying tenets behind data visualization
  o 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 use to supporting 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).

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clicker Participation (9 @ 10 points each – lowest is dropped)</td>
<td>90 points</td>
</tr>
<tr>
<td>D2L Quizzes (10 @ 10 points each)</td>
<td>100 points</td>
</tr>
<tr>
<td>Exams (2 @ 120 points each)</td>
<td>240 points</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>430 points</td>
</tr>
</tbody>
</table>

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/](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.
BIA 3621 – Introduction to Business Analytics Lab

Professor: Dr. Scott J. Seipel
Class: Section D06 – online
       Section D07 – online
Office: BAS N358
Phone: 616.898.2707 office
       615.898.2362 (Computer Information Systems Dept.)
Email: Scott.Seipel@mtsu.edu
Textbooks: 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 spreadsheeting 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 |
| Total | 570 |

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 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.
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
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 and/or contact the DAC for assistance at 615-898-2783 or 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

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture/Practice Files (15 @ 20 pts. each)</td>
<td>300</td>
</tr>
<tr>
<td>Exams (3 @ 150 pts.)</td>
<td>450</td>
</tr>
<tr>
<td>Individual Project (5 milestones at varying pt. values)</td>
<td>550</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1300 points</strong></td>
</tr>
</tbody>
</table>

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 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). 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.
CSCI 1170 - Computer Science I
Course Information (Handout 1)

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:

<table>
<thead>
<tr>
<th>Office Hours: KOM 353</th>
<th>Section 007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday 3:30pm-5pm</td>
<td>Lecture: KOM 307</td>
</tr>
<tr>
<td>Tuesday 2pm-4pm</td>
<td>Monday &amp; Wednesday 12:40pm-2:05pm</td>
</tr>
<tr>
<td>Wednesday 10:30am-Noon</td>
<td>Lab KOM 360</td>
</tr>
<tr>
<td>Thursday 2pm-4pm</td>
<td>Monday &amp; Wednesday 2:20pm-3:20pm</td>
</tr>
<tr>
<td>or by appointment</td>
<td></td>
</tr>
</tbody>
</table>

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) 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
GRADE BASED ON:  (Tentative, subject to change)

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Open Lab Assignments (OLA): Exercises &amp; Projects</td>
<td>20%</td>
</tr>
<tr>
<td>Closed Lab Assignments (CLA)</td>
<td>10%</td>
</tr>
<tr>
<td>Exams (in-term)</td>
<td>40%</td>
</tr>
<tr>
<td>Comprehensive Final Exam</td>
<td>30%</td>
</tr>
</tbody>
</table>

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 makeup 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.)

<table>
<thead>
<tr>
<th>Component</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 007</td>
<td></td>
</tr>
<tr>
<td>Exam 1</td>
<td>Feb 13</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Mar 20</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Apr 10</td>
</tr>
<tr>
<td>Final</td>
<td>Apr 29 (12:30pm-2:30pm)</td>
</tr>
</tbody>
</table>

All exams are closed book, closed notes.

TEXTBOOK:  
Chapter coverage:  1, 2, 3, 4, 5, 6, 8, and 7 (in that order)  (Subject to change)
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
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.

https://cs.mtsu.edu/~untch/1170/info.html (maintained by Roland H. Untch)
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:

<table>
<thead>
<tr>
<th>Office Hours: KOM 353</th>
<th>Section 003</th>
<th>Section 004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday 3:30pm-5pm</td>
<td>Lecture: KOM 307 Tuesday &amp; Thursday 11:20am-12:45pm</td>
<td>Lecture: KOM 307 Tuesday &amp; Thursday 4:20pm-5:45pm</td>
</tr>
<tr>
<td>Tuesday 2pm-4pm</td>
<td>Lab KOM 360 Tuesday &amp; Thursday 1:00pm-2:00pm</td>
<td>Lab KOM 360 Tuesday &amp; Thursday 6:00pm-7:00pm</td>
</tr>
<tr>
<td>Wednesday 10:30am-Noon</td>
<td></td>
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<tr>
<td>Thursday 2pm-4pm</td>
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<tr>
<td>or by appointment</td>
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</tbody>
</table>

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) 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. Students may also contact the DAC for assistance at 615-
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)

<table>
<thead>
<tr>
<th>Grade Component:</th>
<th>Grading Method</th>
<th>CVL</th>
<th>LBR</th>
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<tr>
<td>Open Lab Assignments (OLA): Exercises &amp; Projects</td>
<td></td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>Closed Lab Assignments (CLA)</td>
<td></td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Exams</td>
<td></td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>Comprehensive Final Exam</td>
<td></td>
<td>25%</td>
<td>40%</td>
</tr>
</tbody>
</table>

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.)

<table>
<thead>
<tr>
<th></th>
<th>Section 003</th>
<th>Section 004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Feb 28</td>
<td>Feb 28</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Apr 4</td>
<td>Apr 4</td>
</tr>
<tr>
<td>Final</td>
<td>Apr 30 (10:30am-12:30pm)</td>
<td>May 2 (3:30pm-5:30pm)</td>
</tr>
</tbody>
</table>

All exams are closed book, closed notes.

**TEXTBOOK:**
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
dpaper. 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 / 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.

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/~petey/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.

   Submissions using another class' "c" 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. Also, if you require the use of assistive technology, please make sure to
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)

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  
Kirksey Old Main (KOM) 357  
Telephone: (615) 898-2416

Textbook

Schedule
Please ensure you are reading the meeting times for your course section.

<table>
<thead>
<tr>
<th>Office Hours: KOM 357</th>
<th>Meeting Times</th>
</tr>
</thead>
</table>
| Monday   10:30-11:30am | Section 001 KOM 452  
| Tuesday 3:30-4:30pm  | Monday and Wednesday 12:40-2:05pm |
| Wednesday 9:30-10:30am | |
| Thursday 10:30-11:30am, 2:00-3:00pm | |
| Friday 9:15-10:15am | |
| or by appointment | |

Important Dates

<table>
<thead>
<tr>
<th>Last day to drop without a grade</th>
<th>Jan 27, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last day to drop with a &quot;W&quot;</td>
<td>Mar 24, 2019</td>
</tr>
<tr>
<td>Last day of classes</td>
<td>Apr 24, 2019</td>
</tr>
<tr>
<td>Exam 3 (during final exam session)</td>
<td>Apr 29, 2019</td>
</tr>
</tbody>
</table>

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 by choosing the most 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

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Attendance and Class Partic.</td>
<td>5%</td>
</tr>
<tr>
<td>Homework</td>
<td>15%</td>
</tr>
<tr>
<td>Projects</td>
<td>35%</td>
</tr>
<tr>
<td>Exams</td>
<td>45%</td>
</tr>
</tbody>
</table>

#### Grading Scale

```
<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100</td>
</tr>
<tr>
<td>B</td>
<td>83-89</td>
</tr>
<tr>
<td>C</td>
<td>77-79</td>
</tr>
<tr>
<td>D</td>
<td>67-69</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60</td>
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</tbody>
</table>
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Reasonable Accomodations for Students with Disabilities

Page 138

Academic Affairs, Student Life, and Athletics Committee

September 4, 2019
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. 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.

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[at]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 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, and Open Labs are due by the end of the subsequent lab session (unless the lab specifically states otherwise). 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:

<table>
<thead>
<tr>
<th>Closed Labs</th>
<th>Open Labs</th>
<th>Final Project (RSC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 points each</td>
<td>20 points each</td>
<td>100 points</td>
</tr>
</tbody>
</table>

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.
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[dot]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[dot]mtmail.mtsu.edu

Final Exam
Section 001: Tuesday, April 30, 2019, 10:30 AM - 12:30 PM, WPS 102

Textbook

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. Logism is free and can be downloaded from http://www.cburch.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/aru/. 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

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<table>
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</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Lab Assignments</td>
<td>40%</td>
</tr>
<tr>
<td>Exams</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

Grading
The following grading scale will be used in this class:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
</tr>
<tr>
<td>B</td>
<td>83-86</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
</tr>
<tr>
<td>C</td>
<td>73-76</td>
</tr>
<tr>
<td>C-</td>
<td>70-72</td>
</tr>
<tr>
<td>D+</td>
<td>67-69</td>
</tr>
<tr>
<td>D</td>
<td>63-66</td>
</tr>
<tr>
<td>D-</td>
<td>60-62</td>
</tr>
</tbody>
</table>
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: 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 students' 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.
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](https://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.
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


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++.


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). 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/academisconduct.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. 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: Yi.Gu@mtsu.edu  
Office phone: (615) 904-8238  
Homepage: https://cs.mtsu.edu/~yigu/  
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**

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*

<table>
<thead>
<tr>
<th>Week</th>
<th>Chapter</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 6</td>
<td>1</td>
<td>Computer Networks and the Internet</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Application Layer</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Transport Layer</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>The Network Layer: Data Plane</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Review and Catchup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comprehensive Test 1</td>
</tr>
<tr>
<td>8-14</td>
<td>5</td>
<td>The Network Layer: Control Plane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 13-16, Fall break</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>The Link Layer and LANs</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Wireless and Mobile Networks</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Security in Computer Networks</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Multimedia Networking</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Review and Catchup</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project demo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Q&amp;A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comprehensive Test 2</td>
</tr>
</tbody>
</table>

* Slight modification may be adopted as the course proceeds.

Evaluation and Grade

<table>
<thead>
<tr>
<th>Grading Components</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance</td>
<td>10%</td>
</tr>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Small Tests</td>
<td>20%</td>
</tr>
<tr>
<td>Project</td>
<td>15%</td>
</tr>
<tr>
<td>Comprehensive Test 1</td>
<td>15%</td>
</tr>
<tr>
<td>Comprehensive Test 2</td>
<td>20%</td>
</tr>
</tbody>
</table>

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](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.

<table>
<thead>
<tr>
<th>Grading Scale</th>
<th>Grade**</th>
</tr>
</thead>
<tbody>
<tr>
<td>A- / A</td>
<td>90-93.99 / 94-100</td>
</tr>
<tr>
<td>B- / B / B+</td>
<td>80-83.99 / 84-86.99 / 87-89.99</td>
</tr>
<tr>
<td>C- / C / C+</td>
<td>70-73.99 / 74-76.99 / 77-79.99</td>
</tr>
<tr>
<td>F</td>
<td>0-59.99</td>
</tr>
</tbody>
</table>

**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.

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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[at]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

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/aru/. 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

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<tr>
<th>Assignment Type</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Lab Assignments</td>
<td>40%</td>
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<tr>
<td>Exams</td>
<td>30%</td>
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<tr>
<td>Final Exam</td>
<td>20%</td>
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Grading

The following grading scale will be used in this class:

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<tr>
<th>Grade</th>
<th>Percentage</th>
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<td>A</td>
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<td>A-</td>
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<td>B+</td>
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<td>C+</td>
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<td>C</td>
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<td>C-</td>
<td>70-72</td>
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<td>D+</td>
<td>67-69</td>
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<td>D-</td>
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<td>F</td>
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Academic Affairs, Student Life, and Athletics Committee

September 4, 2019
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 "W" 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.

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 (988-2830) 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 withdraws.

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.

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.
Instructor Information
Dr. Joshua L. Phillips
Department of Computer Science
Middle Tennessee State University
KOM 356
(615) 494-7965
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

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 JupyterLabHub (an interactive Jupyter 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 [link1], [link2], [link3] or [link4]. 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 [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 [mgt.cs.mtsu.edu]. For the password for [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.)
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Performance Evaluation

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Grading
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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 “F” 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
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Financial Aid Notice

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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/LOTTEV.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

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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.

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.
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) 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 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:
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) 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 HYPERLINK "http://www.mtsu.edu/dac". and/or contact the DAC for assistance at 615-898-2783 or 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.

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Course Syllabus

Economics 2420: Principles of Microeconomics
Fall 2018 – 3 Credits

Instructor: Aaron Gamino
Office Hours: W: 12:00 – 5:00 pm and by appointment
BAS N306
Aaron.gamino@mtsu.edu
DO NOT EMAIL THE D2L ADDRESS

Teaching Assistants: Sanjin Mehic
Sm6q@mtmail.mtsu.edu
Vedran Vujic
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.

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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:

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you must earn a cumulative TELS GPA of 2.75 after 24 and 48 attempted hours and a cumulative
TEL5 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-
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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/attendance. 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:

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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
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)
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)
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

Additional materials (PowerPoint slides, homework, review materials, etc.) are on D2L.

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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.

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<th>Component</th>
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<tr>
<td>Problems Sets</td>
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<td>Exam 1</td>
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<td>Exam 2</td>
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<td>Writing Assignments</td>
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<td>Research Paper</td>
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<td>Total</td>
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The course grade scale is A > 90%; 90% > B ≥ 80%; 80% > C ≥ 70%; 70% > D ≥ 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/ (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.

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**Course Schedule: Begins on the next page.**
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<td><strong>Feb.</strong></td>
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|           | 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. |
Course Syllabus

INFS 3470 – Python for Business Applications

Instructor: Michael Murphy
Office Location: N335, BAS building 3rd Floor
Office Hours: (Spring) Monday 2:30pm - 4:30pm; Tuesday, Thursday 2:30pm - 4pm
Email: Michael.Murphy@mtsu.edu (Please do not use D2L email)

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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:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
<th>Grade</th>
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<tbody>
<tr>
<td>PA + CE + QUIZ</td>
<td>~ 50%</td>
<td>90% and above A</td>
</tr>
<tr>
<td>Midterm project</td>
<td>~ 20%</td>
<td>80%-89.99% B</td>
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<tr>
<td>Final project</td>
<td>~ 30%</td>
<td>70%-79.99% C</td>
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<td></td>
<td></td>
<td>60%-69.99% D</td>
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<tr>
<td></td>
<td></td>
<td>59.99% and below F</td>
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</table>

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.
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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:

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:
- Direct 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

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.
**Class Announcements**
Class announcements, such as assignment deadline adjustments, will be posted on the course D2L homepage. 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.
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
By Coronel & Morris
Software: Lucid Chart (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 and/or contact the DAC for assistance at 615-898-2783 or 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.

Graded Items:

<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take-home tests</td>
<td>400</td>
</tr>
<tr>
<td>Midterm</td>
<td>300</td>
</tr>
<tr>
<td>Final Exam</td>
<td>300</td>
</tr>
</tbody>
</table>

**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). 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. To keep up-to-date with important information from the department (news, announcements, etc.), please visit our Facebook page at 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
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
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:

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>A</td>
</tr>
<tr>
<td>87-89</td>
<td>B+</td>
</tr>
<tr>
<td>80-86</td>
<td>B</td>
</tr>
<tr>
<td>77-79</td>
<td>C+</td>
</tr>
<tr>
<td>70-76</td>
<td>C</td>
</tr>
<tr>
<td>67-69</td>
<td>D+</td>
</tr>
<tr>
<td>60-66</td>
<td>D</td>
</tr>
<tr>
<td>&lt;60</td>
<td>F</td>
</tr>
</tbody>
</table>

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.
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:
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*, 5th 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 schedule 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/). 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, 1st 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:**
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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, 8th 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.
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.
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

Course Syllabus

Grading Policies

University Policies

Course Schedule

Homework

Sample Grading sheets

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

Course Information:

Time: 8:00 - 8:55 am; MWF

Room: KOM, 300

Prerequisites: MATH 1910—Calculus I (C or better)

Text: Elementary Linear Algebra, 8th edition 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 and other times by appointment
# Math 2010 - Linear Algebra

## Course Syllabus

### Purpose:
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.

### Learning Objectives:
- Enhanced mathematical and problem solving skills.
- Learned the basic definitions and arithmetic properties of vectors and matrices.
- Developed an understanding of the geometric implications of vectors and matrices.
- Understand the role and properties of functions between multi-dimensional spaces.
- Learn the use of technologies which are appropriate to the material in the course.
- Appreciate the variety of applications of linear algebra; achieve competence in several application areas.
- Understand the role of matrices in structuring calculations and as mathematical elements in their own right.

### Typical Outline:
This course will include material from Chapters 1-7 of the required text, along with a selection of applications. For additional information, see the Course Schedule. Topics included in the course consist of:
- Matrices and Systems of Linear Equations
- Determinants
- Vectors in 2, 3, and n-dimensional Spaces
- General Vector Spaces and products in vector spaces
- Linear Transformations, with special reference to those maps from n dimensional to m dimensional Euclidean spaces
- Eigenvalues, Eigenvectors and Diagonalization

### Grading:
Knowledge will be assessed and grades will be assigned according to the grading scale. The grading scale is found later in this booklet in the grading policy section, p.4.

### General Information:
- Participation grade: See information in grading policy, p. 4. Missing classes will negatively affect your grade immediately and continuously. **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.
- 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.
- 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.
- The syllabus may change at the discretion of the instructor.
MATH 2010 - Grading Policies

Evaluation of your grade in the course will be made based on the following assignments:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 in-class tests</td>
<td>300</td>
</tr>
<tr>
<td>Comprehensive final</td>
<td>200</td>
</tr>
<tr>
<td>Definition Tests (Weekly; Wednesdays)</td>
<td>50</td>
</tr>
<tr>
<td>Homework (WebAssign) (80% average on 80% attempted)</td>
<td>50</td>
</tr>
</tbody>
</table>

**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 \( \frac{95+85+87+156+50+44}{600} \) 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+.

Grading Scale: +/− grading scale will be used:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100</td>
</tr>
<tr>
<td>B+</td>
<td>87 - 89</td>
</tr>
<tr>
<td>B</td>
<td>83 - 86</td>
</tr>
<tr>
<td>B-</td>
<td>80 - 82</td>
</tr>
<tr>
<td>C+</td>
<td>77 - 79</td>
</tr>
<tr>
<td>C</td>
<td>73 - 76</td>
</tr>
<tr>
<td>C-</td>
<td>70 - 72</td>
</tr>
<tr>
<td>D+</td>
<td>67 - 69</td>
</tr>
<tr>
<td>D</td>
<td>63 - 66</td>
</tr>
<tr>
<td>D-</td>
<td>60 - 62</td>
</tr>
<tr>
<td>F</td>
<td>0 - 59</td>
</tr>
</tbody>
</table>

**Averaging protocols—**

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. 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, 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:
<table>
<thead>
<tr>
<th>Date</th>
<th>Chapter</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/14/19</td>
<td>1.1</td>
<td>Introduction; Systems of Linear Equations</td>
</tr>
<tr>
<td>1/16/19</td>
<td>1.2</td>
<td>Gaussian Elimination &amp; Gauss-Jordan Elimination; Technology</td>
</tr>
<tr>
<td>1/18/19</td>
<td>1.3</td>
<td>Applications of Systems of Linear Equations</td>
</tr>
<tr>
<td>1/21/19</td>
<td></td>
<td>MLK day; no classes</td>
</tr>
<tr>
<td>1/23/19</td>
<td>2.1</td>
<td>Operations with Matrices</td>
</tr>
<tr>
<td>1/25/19</td>
<td>2.2, 2.3</td>
<td>Properties of Matrix Operations; the Inverse of a Matrix</td>
</tr>
<tr>
<td>1/28/19</td>
<td></td>
<td>Test I</td>
</tr>
<tr>
<td>1/30/19</td>
<td>2.4</td>
<td>Elementary Matrices; L,U - decomposition</td>
</tr>
<tr>
<td>2/1/19</td>
<td>2.5</td>
<td>Markov Chains</td>
</tr>
<tr>
<td>2/4/19</td>
<td>2.6</td>
<td>More Applications of Matrix Operations</td>
</tr>
<tr>
<td>2/6/19</td>
<td>3.1</td>
<td>The Determinant of a Matrix</td>
</tr>
<tr>
<td>2/8/19</td>
<td>3.2</td>
<td>Determinants and Elementary Operations</td>
</tr>
<tr>
<td>2/11/19</td>
<td>3.3</td>
<td>Properties of Determinants</td>
</tr>
<tr>
<td>2/13/19</td>
<td>3.4</td>
<td>Applications of Determinants</td>
</tr>
<tr>
<td>2/15/19</td>
<td>4.1</td>
<td>Vectors in Real Space</td>
</tr>
<tr>
<td>2/18/19</td>
<td>4.2</td>
<td>Vector Spaces</td>
</tr>
<tr>
<td>2/20/19</td>
<td>4.3</td>
<td>Subspaces of Vector Spaces</td>
</tr>
<tr>
<td>2/22/19</td>
<td>4.4</td>
<td>Spanning Sets and Linear Independence</td>
</tr>
<tr>
<td>2/25/19</td>
<td>4.4</td>
<td>Spanning Sets and Linear Independence</td>
</tr>
<tr>
<td>2/27/19</td>
<td>4.5</td>
<td>Basis and Dimension</td>
</tr>
<tr>
<td>3/1/19</td>
<td></td>
<td>Test II</td>
</tr>
<tr>
<td>3/4/19 - 3/8/19</td>
<td></td>
<td>Spring Break</td>
</tr>
<tr>
<td>3/11/19</td>
<td>4.6</td>
<td>Rank of a Matrix and Systems of Linear Equations</td>
</tr>
<tr>
<td>3/13/19</td>
<td>4.7</td>
<td>Coordinates and Change of Basis</td>
</tr>
<tr>
<td>3/15/19</td>
<td>4.7</td>
<td>Coordinates and Change of Basis</td>
</tr>
<tr>
<td>3/18/19</td>
<td>4.7</td>
<td>Coordinates and Change of Basis</td>
</tr>
<tr>
<td>3/20/19</td>
<td>5.1</td>
<td>Length and Dot Product</td>
</tr>
<tr>
<td>3/22/19</td>
<td>5.2</td>
<td>Inner Product Spaces</td>
</tr>
<tr>
<td>3/25/19</td>
<td>5.3</td>
<td>Orthonormal Bases: Gram-Schmidt Process</td>
</tr>
<tr>
<td>3/27/19</td>
<td>5.3</td>
<td>Orthonormal Bases: Gram-Schmidt Process</td>
</tr>
<tr>
<td>3/29/19</td>
<td>6.1</td>
<td>Introduction to Linear Transformations</td>
</tr>
</tbody>
</table>

*The schedule may change at the discretion of the instructor.*
## MATH 2010 - Course Schedule:

<table>
<thead>
<tr>
<th>Date</th>
<th>Chapter</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/1/19</td>
<td>6.3</td>
<td>Matrices for Linear Transformations</td>
</tr>
<tr>
<td>4/3/19</td>
<td></td>
<td>Test III</td>
</tr>
<tr>
<td>4/5/19</td>
<td>6.2</td>
<td>The Kernel and Range of a Linear Transformation</td>
</tr>
<tr>
<td>4/8/19</td>
<td>7.1</td>
<td>Eigenvalues and Eigenvectors</td>
</tr>
<tr>
<td>4/10/19</td>
<td>7.1</td>
<td>Eigenvalues and Eigenvectors</td>
</tr>
<tr>
<td>4/12/19</td>
<td>7.2</td>
<td>Diagonalization and Applications</td>
</tr>
<tr>
<td>4/15/19</td>
<td></td>
<td>Least Squares Approximation</td>
</tr>
<tr>
<td>4/17/19</td>
<td></td>
<td>Lines in R^n, Revisited</td>
</tr>
<tr>
<td>4/19/19</td>
<td></td>
<td>Planes in R^n, Revisited</td>
</tr>
<tr>
<td>4/22/19</td>
<td></td>
<td>Quadric Surfaces and Rotations in R^3</td>
</tr>
<tr>
<td>5/1/19</td>
<td></td>
<td>Final Exam - 7:30 – 9:30 am</td>
</tr>
</tbody>
</table>

*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.

<table>
<thead>
<tr>
<th>Section:</th>
<th>Problems:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test 1:</strong></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>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</td>
</tr>
<tr>
<td>1.2</td>
<td>28, 29, 33, 35, 38, 40, 41, 43, 45, 47, 48, 51, 65</td>
</tr>
<tr>
<td>1.3</td>
<td>3, 6, 7, 9, 12, 13, 15, 16, 18, 20, 21, 22, 24, 31, 33, 37, 38</td>
</tr>
<tr>
<td>2.1</td>
<td>6, 9, 11, 12, 13, 16, 17, 20, 21, 22, 24, 26, 37, 45, 48, 49, 50, 53, 55, 63, 69, 79, 81</td>
</tr>
<tr>
<td>2.2</td>
<td>3, 11, 13, 19, 22, 25, 39, 42, 45, 46, 49, 52, 59, 62, 68, 72, 76, 77</td>
</tr>
<tr>
<td>2.3</td>
<td>2, 10, 11, 17, 20, 23, 24, 27, 31, 34, 41, 43, 46, 47, 50, 51, 54, 61, 68, 70</td>
</tr>
<tr>
<td>2.4</td>
<td>5, 6, 10, 11, 13, 16, 20, 21, 27, 33, 34, 43, 46, 47, 48, 51, 53</td>
</tr>
<tr>
<td><strong>Test 2:</strong></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>4, 7, 8, 9, 11, 12, 13, 15, 24, 27, 33, 34, 36, 37, 43, 45, 50</td>
</tr>
<tr>
<td>2.6</td>
<td>5, 8, 11, 12, 13, 14, 20, 24, 26, 27</td>
</tr>
<tr>
<td>3.1</td>
<td>5, 12, 19, 21, 23, 26, 29, 37, 39, 40, 45, 49, 55, 58, 63, 66</td>
</tr>
<tr>
<td>3.2</td>
<td>21, 22, 26, 29, 30, 34, 35, 39, 44</td>
</tr>
<tr>
<td>3.3</td>
<td>8, 12, 15, 25, 29, 33, 45, 55, 75</td>
</tr>
<tr>
<td>3.4</td>
<td>38, 40, 53, 54, 56, 61</td>
</tr>
<tr>
<td>4.1</td>
<td>8, 14, 16, 25, 30, 35, 44, 47, 48, 50, 53, 65, 68</td>
</tr>
<tr>
<td>4.2</td>
<td>13, 15, 18, 21, 22, 25, 26, 31, 32, 45, 47</td>
</tr>
<tr>
<td>4.3</td>
<td>3, 4, 5, 8, 11, 15, 17, 21, 26, 27, 28, 30, 32, 36, 37, 39, 41, 47, 48</td>
</tr>
<tr>
<td>4.4</td>
<td>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</td>
</tr>
<tr>
<td>4.5</td>
<td>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</td>
</tr>
</tbody>
</table>

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.
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](#).

<table>
<thead>
<tr>
<th>Section:</th>
<th>Problems:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test 3:</strong></td>
<td></td>
</tr>
<tr>
<td>4.6</td>
<td>7, 10, 11, 13, 15, 18, 20, 25, 27, 34, 35, 38, 40, 41, 45, 46, 48, 51, 52, 54, 58, 60, 61</td>
</tr>
<tr>
<td>4.7</td>
<td>2, 4, 5, 7, 9, 10, 11, 13, 14, 17, 19, 21, 22, 24, 26, 30, 33, 35, 37, 40, 42, 43, 47, 48</td>
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<tr>
<td>5.1</td>
<td>1, 5, 8, 12, 13, 18, 23, 24, 26, 27, 32, 40, 42, 43, 46, 48, 50, 51, 54, 55, 57</td>
</tr>
<tr>
<td>5.2</td>
<td>1, 4, 7, 11, 13, 14, 18, 20, 23, 25, 27, 30, 33, 36, 41, 43, 47, 49, 51, 70, 72, 75, 78, 80, 83</td>
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<tr>
<td>5.3</td>
<td>1, 6, 7, 10, 11, 13, 15, 19, 27, 30, 34, 37, 39, 45, 46, 48, 57, 58,</td>
</tr>
<tr>
<td>6.1</td>
<td>1, 2, 5, 6, 9, 11, 13, 15, 17, 19, 21, 23, 24, 26, 27, 29, 30, 35, 36, 39, 42, 44, 48, 57, 59, 67, 76, 79</td>
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<td>6.3</td>
<td>1, 3, 4, 5, 8, 9, 11, 12, 15, 16, 20, 21, 23, 24, 31, 33, 34, 37, 38, 40, 43, 44, 45</td>
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<tr>
<td><strong>Remainder:</strong></td>
<td></td>
</tr>
<tr>
<td>6.2</td>
<td>1, 3, 4, 5, 8, 11, 12, 17, 21, 27, 30, 33, 36, 38, 42, 44, 47, 70</td>
</tr>
<tr>
<td>7.1</td>
<td>2, 4, 6, 9, 11, 17, 22, 24, 28, 33, 35, 38, 40, 41, 43, 45, 48, 75, 77</td>
</tr>
<tr>
<td>7.2</td>
<td>2, 3, 6, 7, 9, 13, 17, 20, 27, 28, 30, 33, 35, 40</td>
</tr>
</tbody>
</table>

**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  
Office: KOM 325-F  
Phone: 615-898-5540  
E-mail: Ginger.Rowell@mtsu.edu

Office Hours: MWF: 8:30 am – 10:00am

Text: Whitlock and Schluder, 2nd Ed. *The Analysis of Biological Data* (physical textbook):  

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

<table>
<thead>
<tr>
<th>Test</th>
<th>Date</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>02-13-19</td>
<td>100pts</td>
</tr>
<tr>
<td>Test 2</td>
<td>03-25-19</td>
<td>100pts</td>
</tr>
<tr>
<td>Test 3</td>
<td>04-17-19</td>
<td>100pts</td>
</tr>
<tr>
<td>Homework/quizzes/other – throughout the semester</td>
<td>100pts</td>
<td></td>
</tr>
<tr>
<td>Final Exam</td>
<td>04-29-19 (9:30-11:30am)</td>
<td>200pts</td>
</tr>
</tbody>
</table>

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 24th.
- 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/). 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, 1st 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. 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.

**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.
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 schedule 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.

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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).

**Math Tutoring Lab (MTL):**
Math tutoring for this course is available as a free service to MTSU students in the James E. Walker Library, 1st 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 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.
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.

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
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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) (http://www.mtsu.edu/registration/spring-exams.php)
Instructor: Dr. Ping Zhang

Office: KOM 325G

Phone: 898-5939

E-mail: pzhang@mtsu.edu

Office Hours: MWF: 8:00am – 09:00am, 10:30am – 11:30am; TR: 08:00am – 10:00pm, or by appointment


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.

New Course/ Reactivation* ☑️ New course
Course reactivation

Department/ College* College of Basic and Applied Sciences

Effective term Summer 2019

Course type* Data Science

Course prefix* DATA

Course no.* 1500

Full course title (100 characters only)* Introduction to Data Science

Abbreviated course title (30 characters only)* Introduction to Data Science

Credit hours* 3
Contact hours (if different)

Grading* ☑️ Standard ☐ 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.


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*

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.**

| Course prerequisites/ co-requisites/ restrictions | No prerequisites. |

Course Description

Describe the course including clinical, internship, or other experiential components.

Course description

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 understand 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 expost 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.
of such new faculty.

<table>
<thead>
<tr>
<th>Faculty/ additional faculty</th>
<th>The faculty for this course can be cross disciplines. Individuals that are capable of teaching this course include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charles Apigian</td>
<td>Professor of Information Systems &amp; Analytics</td>
</tr>
<tr>
<td>Interim Director of the Data Science Institute</td>
<td></td>
</tr>
<tr>
<td>Joshua Phillips</td>
<td>Associate Professor in Computer Science</td>
</tr>
<tr>
<td>Amy Harris</td>
<td>Associate Professor of Information Systems &amp; Analytics</td>
</tr>
</tbody>
</table>

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 | 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.

| Learning resource materials | 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.

| Contribution to certification | 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.

<table>
<thead>
<tr>
<th>Sources/extent of advice and consultation</th>
<th>The class was part of a proposal for a new Data Science undergraduate degree. This committee includes:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Carlos Coronel (Information Systems &amp; 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 &amp; Analytics), Scott Seipel (Information Systems &amp; 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 &amp; Analytics), Meda Sarkar (Computer Science), and Brian Hinote (Office of Student Success).</td>
</tr>
</tbody>
</table>

This class was also vetted by a group of Data Science professionals at a meeting on December 11, 2018. The curriculum and new courses was given to them to review and at a lunch meeting in Nashville, they were able to review 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.

| Estimated expenditures | 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.**

| Sources of revenue | 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.

<table>
<thead>
<tr>
<th>Course topics outline</th>
<th>This outline goes through the machine learning process along with topics that are important to understand in Data Science.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Introduction to Data Science</td>
</tr>
<tr>
<td></td>
<td>• What is Data Science</td>
</tr>
<tr>
<td></td>
<td>• What do Data Scientists do and the skills needed</td>
</tr>
<tr>
<td></td>
<td>• Identify all skills needed to become a Data Scientist</td>
</tr>
<tr>
<td></td>
<td>• How are corporations and other agencies using data</td>
</tr>
<tr>
<td></td>
<td>Using the CRISP Model to work through a problem</td>
</tr>
<tr>
<td></td>
<td>• Business Understanding</td>
</tr>
<tr>
<td></td>
<td>• Determining Business Objectives</td>
</tr>
<tr>
<td></td>
<td>• Assessing the Situation</td>
</tr>
<tr>
<td></td>
<td>• Determine Data Mining Goals</td>
</tr>
<tr>
<td></td>
<td>• Producing a Project Plan</td>
</tr>
<tr>
<td></td>
<td>• Data Understanding</td>
</tr>
<tr>
<td></td>
<td>• Collect Data</td>
</tr>
<tr>
<td></td>
<td>• Describe Data</td>
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<tr>
<td></td>
<td>• Explore Data</td>
</tr>
<tr>
<td></td>
<td>• Data Preparation</td>
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<tr>
<td></td>
<td>• Select Data</td>
</tr>
<tr>
<td></td>
<td>• Clean Data</td>
</tr>
<tr>
<td></td>
<td>• Construct and Transform Data</td>
</tr>
<tr>
<td></td>
<td>• Integrate Data</td>
</tr>
</tbody>
</table>
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 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.

<table>
<thead>
<tr>
<th>Proposed evaluation procedures</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied HW (4 @ 75 pts. each)</td>
<td>300</td>
</tr>
<tr>
<td>In-class Assignments (5 @ 20 pts. each)</td>
<td>100</td>
</tr>
<tr>
<td>Data Science Project</td>
<td>200</td>
</tr>
<tr>
<td>Midterm</td>
<td>150</td>
</tr>
<tr>
<td>Final Exam</td>
<td>250</td>
</tr>
</tbody>
</table>
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:


Also required is the CRISP-DM Guide

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

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.
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CBAS Other

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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.
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* ☐ New course  ☐ 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
<table>
<thead>
<tr>
<th>Credit hours*</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hours (if different)</td>
<td></td>
</tr>
<tr>
<td>Grading*</td>
<td>☐ Standard ☐ Pass/Fail</td>
</tr>
<tr>
<td>Repeatable for additional credit*</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>If yes, number of repeats</td>
<td></td>
</tr>
<tr>
<td>OR total hours</td>
<td></td>
</tr>
<tr>
<td>Schedule type*</td>
<td>Lecture (LEC)</td>
</tr>
<tr>
<td>Instructional method*</td>
<td>Conventional Methodology (CON)</td>
</tr>
<tr>
<td>6-digit CIP Code</td>
<td>Data Model/Warehous DB Admin (110802)</td>
</tr>
</tbody>
</table>

**NOTE:** The prescribed requirement (below) is for lower-division courses (1000-2000 level) that will require completion of prescribed requirements (k courses).

<table>
<thead>
<tr>
<th>Prescribed requirement</th>
<th>Writing</th>
<th>Reading</th>
<th>Math</th>
</tr>
</thead>
</table>

**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.

<table>
<thead>
<tr>
<th>Cross listed/ Dual listed?**</th>
<th>☐ Yes ☐ No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course to be cross listed/ dual listed</td>
<td>STAT 3550</td>
</tr>
</tbody>
</table>

**General Education**

<table>
<thead>
<tr>
<th>Is this course being proposed for General Education credit?*</th>
<th>☐ Yes ☐ No</th>
</tr>
</thead>
</table>

If yes, the appropriate General Education form must be attached.

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.

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.

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.

<table>
<thead>
<tr>
<th>Required student activities</th>
<th>Attending class regularly, homework, a class project with a class presentation. The class project and homework may require computer programming.</th>
</tr>
</thead>
</table>

### 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.

<table>
<thead>
<tr>
<th>Proposed evaluation procedures</th>
<th>Student grades will be based on homework, tests, and project grades.</th>
</tr>
</thead>
</table>

### 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.

<table>
<thead>
<tr>
<th>References and text</th>
<th>There are several books in the area. One in particular that is reasonable is Applied Predictive Modeling By Max Kuhn and Kjell Johnson.</th>
</tr>
</thead>
</table>

### 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.

<table>
<thead>
<tr>
<th>Graduate credit justification</th>
<th>n/a</th>
</tr>
</thead>
</table>

### Comments

Please provide any other pertinent information not previously covered.
Contact Information

**Department contact name**
Lisa Green

**Campus phone**
898-2608

**Campus email**
lisa.green@mtsu.edu

Routing

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
<table>
<thead>
<tr>
<th>Academic Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLA - Anthropology #</td>
</tr>
<tr>
<td>CLA - Sociology Undergraduate ^</td>
</tr>
<tr>
<td>CLA - Sociology Graduate *</td>
</tr>
<tr>
<td>CLA - Theatre and Dance.</td>
</tr>
<tr>
<td>CLA - World Languages, Literatures, and Cultures.</td>
</tr>
<tr>
<td>CLA Other</td>
</tr>
<tr>
<td>CME - Journalism and Strategic Media.</td>
</tr>
<tr>
<td>CME - Media and Communication (MS).</td>
</tr>
<tr>
<td>CME - Media Arts.</td>
</tr>
<tr>
<td>CME - Recording Industry.</td>
</tr>
<tr>
<td>CME Other</td>
</tr>
<tr>
<td>UC - University Studies.</td>
</tr>
<tr>
<td>UC Other</td>
</tr>
<tr>
<td>XYZ - ABC Academic Department.</td>
</tr>
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</table>

**PROVOST OFFICE USE ONLY**

| GC/UCC approval date | March 22, 2019 UCC |

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* | ☐ New course  
| 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 |
<p>| Abbreviated course title (30 characters only)* | Large-Scale Data |</p>
<table>
<thead>
<tr>
<th>Credit hours*</th>
<th>3</th>
</tr>
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<tbody>
<tr>
<td>Contact hours (if different)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>Grading*</td>
<td>○ Standard ○ Pass/Fail</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatable for additional credit*</td>
<td>○ Yes ○ No</td>
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<td></td>
<td></td>
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<tr>
<td>If yes, number of repeats</td>
<td></td>
</tr>
<tr>
<td>OR total hours</td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule type*</td>
<td>LEC - Lecture</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional method*</td>
<td>CON - Conventional Methodology</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6-digit CIP Code</td>
<td>Statistics (270501)</td>
</tr>
</tbody>
</table>

**NOTE:** The prescribed requirement 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.

Crosslisted?** | ○ Yes ○ No

Course to be cross listed | STAT 5700 (dual listed with STAT 4700)

### General Education

Is this course being proposed for General Education credit?*

- ○ Yes ○ No

If yes, the appropriate General Education form must be attached.


Please attach any required files by navigating to the Proposal Toolbox and clicking ![attach](https://www.mtsu.edu/attach.png) in the top right corner.
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... |
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.

| Course justification | 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.

| Projected enrollment | 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.

| Relation to departmental curricula | 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.

| Justify duplication and list departments consulted | 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.
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.**

| 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.

<table>
<thead>
<tr>
<th>Course topics outline</th>
<th>This course introduces new statistical methods and computational tools for analyzing Big Data. This course covers the following topics: 1. Introduction of Statistical challenges of Big Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Heterogeneity vs. Commonality</td>
</tr>
<tr>
<td></td>
<td>• Challenges of massive data</td>
</tr>
<tr>
<td></td>
<td>• Challenges of high dimensional data</td>
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<tr>
<td></td>
<td>• Challenges of complex and noisy data</td>
</tr>
<tr>
<td>2. Handling massive data: divide-and-conquer statistical inference</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Introduction of MapReduce framework</td>
</tr>
<tr>
<td></td>
<td>• Divide-and-conquer approach for statistical estimation and inference</td>
</tr>
<tr>
<td></td>
<td>• Cluster Analysis: Hierarchical Clustering and K-means Clustering (centroid based)</td>
</tr>
<tr>
<td></td>
<td>• Random Forests, Boosting</td>
</tr>
<tr>
<td></td>
<td>• Neural Networks</td>
</tr>
<tr>
<td>3. Handling high dimensional data: regularization method</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Introduction of regularization framework</td>
</tr>
<tr>
<td></td>
<td>• Shrinkage Methods: Ridge Regression, LASSO, Elastic Net, OSCAR, etc.</td>
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<tr>
<td></td>
<td>• Dimension Reduction Methods: sparse covariance estimation, PCA, PLS</td>
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<tr>
<td></td>
<td>• Support Vector Machines</td>
</tr>
<tr>
<td></td>
<td>• Undirected Graphical Models</td>
</tr>
<tr>
<td>4. Handling complex and noisy data: robust semiparametric method</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A new perspective on the roles of Gaussianity and linearity in multivariate analysis</td>
</tr>
<tr>
<td></td>
<td>• Relaxing Gaussianity: transelliptical modeling and regularized rank based methods</td>
</tr>
</tbody>
</table>
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.


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.

Contact Information

<table>
<thead>
<tr>
<th>Department contact name*</th>
<th>Lisa Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus phone</td>
<td>615-898-5775</td>
</tr>
<tr>
<td>Campus email</td>
<td><a href="mailto:lisa.green@mtsu.edu">lisa.green@mtsu.edu</a></td>
</tr>
</tbody>
</table>

Routing

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.
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  
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 recoded 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 recoded 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.

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Forms: none.

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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.