

MATH499

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Course Summary

Course : MATH499 **Title :** Senior Seminar in Mathematics

Length of Course : 8

Prerequisites : **Credit Hours :** 3

Description

Course Description: The Capstone course is a senior level course designed to allow the student to review, analyze, and integrate the work the student has completed toward a degree in Mathematics. The students will examine a number of real-world case studies; prepare an approved academic project or paper; and demonstrate mastery of their program of study in a meaningful culmination of their learning. Prerequisite: Completion of a minimum of 106 hours towards your program.

Course Scope:

This capstone course explores topics in the mathematical sciences including: Calculus, statistics and analytical methods; the use of critical thinking skills in assessing problems; the formulation and the implementation of mathematical models in order to solve problems or to provide insights into complex issues; the application of qualitative and quantitative methods; and the communication of mathematics.

Students will complete academic research exercises to demonstrate their knowledge of mathematics. Students are expected to select topics and use knowledge from the mathematical domains to solve or provide insights into complex problems. It is expected that the student will conduct research, provide analysis, and produce a final paper and a presentation to the faculty.

The capstone course is designed to polish the students' analytical, research and presentation skills from the variety of mathematics areas studied. The student must demonstrate that they can confidently confront the challenges and demands of specialized research and written communication.

Objectives

After successfully completing this course, you will be able to:

- CO-1 Demonstrate a solution to a real-world problem using advanced mathematics such as calculus, statistics or analytical methods.
- CO-2 Produce mathematical models to solve problems or provide insights into complex issues.
- CO-3 Implement mathematical models to solve problems or provide insights into complex issues.
- CO-4 Analyze real world problems using qualitative and quantitative methods.

- CO-5 Solve problems using applied mathematics.
 - CO-6 Analyze the results of research and analysis in the mathematical domains.
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Outline

Week 1: Application of Mathematics

Learning Objectives

CO-1 Demonstrate a solution to a real-world problem using advanced mathematics such as calculus, statistics or analytical methods.

Assignments

Week 1 Forums

- Topic 1 - Introduction (2 points)
- Topic 2 – Synchronous session: Capstone Paper and Briefing Requirements

Quiz 1 – Basic mathematics topics (8 points)

Week 2: Analyzing Problems

Learning Objectives

CO-4 Analyze real world problems using qualitative and quantitative methods.

CO-5 Solve problems using applied mathematics.

Assignments

Week 2 Forum:

- Topic 1 – Library Resources and Research (2 points)
- Topic 2 – Synchronous session: Weekly report and topic selection and approval

Quiz 2 – Mathematics topics from the core courses (8 points)

Assignment 1: Topic approval for the Capstone paper (2 points)

Week 3: Developing and Applying Mathematical Models

Learning Objectives

CO-2 Produce mathematical models to solve problems or provide insights into complex issues.

CO-3 Implement mathematical models to solve problems or provide insights into complex issues.

Assignments

Week 3 Forum - Synchronous session: Weekly report and discussion of annotated bibliography

Quiz 3 – Mathematics topics from the concentration courses (8 points)

Assignment 2: Annotated bibliography (2 points)

Week 4: Mathematics Research 1

Learning Objectives

CO-6 Analyze the results of research and analysis in the mathematical domains.

Assignments

Week 4 Forum - Synchronous session: Weekly report and discussion

Assignment 3: Capstone paper outline (2 points)

Week 5: Mathematics Research 2

Learning Objectives

CO-6 Analyze the results of research and analysis in the mathematical domains.

Assignments

Week 5 Forum - Synchronous session: Weekly report and discussion

Assignment 4: first draft of the Capstone paper (2 points)

Week 6: Mathematics Research 3

Learning Objectives

CO-6 Analyze the results of research and analysis in the mathematical domains.

Assignments

Week 6 Forum - Synchronous session: Weekly report and discussion

Week 7: Mathematics Research 4

Learning Objectives

CO-6 Analyze the results of research and analysis in the mathematical domains.

Assignments

Week 7 Forum - Synchronous session: Weekly report and discussion

Assignment 5: final draft of the Capstone paper with revisions (2 points)

Week 8: Capstone Project completion and presentation

Learning Objectives

CO-1 thru CO-6

Assignments

Week 8 Forum - Final Course and Program Reflections (2 points)

Assignment: Completed Capstone Paper (50 points)

Assignment: Synchronous session: Capstone Briefing (audio-visual briefing and presentation of the Capstone paper) (10 points)

Evaluation

Student evaluation will be based on graded forums, quizzes, written assignments, a Capstone paper and a project briefing.

Forums. There will be a weekly Forum to discuss progress with researching and preparing the capstone paper. These Forums may be synchronous sessions conducted via Adobe Connect sessions. Students will prepare and present a summary of their work during the past week and the work planned for the upcoming week. In addition, There will be three graded Forums (2 points each) counting as 6% of the course grade. Specific directions and a grading rubric will be provided for these graded Forums.

Quizzes. There will be three graded quizzes (8 points each) counting as 24% of the course grade.

- Quiz 1 will include questions from basic mathematics courses including algebra, trigonometry, geometry and discrete math. (Week 1)
- Quiz 2 will include questions from the core learning courses including Calculus, linear algebra, probability, statistics, differential equations, data analysis, modeling, and operations research. (Week 2)
- Quiz 3 questions will come from the concentration courses in the students program (i.e., Applied Math, Statistics or Operations Research). There will be a separate quiz for each degree concentration. (Week 3)

These quizzes will be available online in the classroom and will each consist of up to 20 questions each. They may include multiple choice, fill in the blank, short answer, numerical answers or essay questions. The quizzes are found via the navigation link labeled "Assignments." Students must complete each test by the due date noted in the syllabus and in the classroom announcements. These are open-book and open-note quizzes, but are not collaborative efforts. Proper references and citations must be provided in essay question responses.

Assignments. There will be five assignments (2 points each) totaling 10% of the course grade. These assignments will guide you in researching and preparing your capstone paper. Each week you will be working on a portion of the final paper. These assignments will include topic selection and approval, annotated bibliography, paper outline, preparing the first and final drafts, and then polishing those drafts into a final product.

Capstone Paper. The Capstone paper (50 points) will be worth 50% of the course grade. It will follow a conventional report format (introduction, body, including discussion, analysis, conclusions and recommendations (if appropriate), and references. The paper is to follow the APA style guide and should be 20-25 pages in length. The student will submit the final paper to the faculty for review. The final paper will be uploaded to an Assignment.

Capstone Briefing. Students will prepare and deliver a live, audio-visual briefing to the faculty to summarize and explain their research, findings, conclusions and recommendations. This briefing is worth 10 points and will count as 10% of the course grade. Briefing or lecture slides will be uploaded to an Assignment.

All assignments and forum responses are required by 11:55 PM Eastern Time of the Sunday of the week assigned.

Time Management.

Students must plan and manage competing demands and priorities on their time and are expected to submit classroom assignments on time. The instructor will post assignment due dates and times in the Syllabus and the Weekly Announcements. Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. For late assignments, students need to contact the faculty member ahead of time about their individual situation.

Capstone Requirements

There are two requirements for the Capstone Project: a research paper and a briefing to faculty on the results of your research. The requirements for each of these are shown below.

Capstone Paper.

Topic

You must submit your research paper topic for approval as soon as possible, but no later than by the end of week 2. You are encouraged to choose a topic which relates directly to your job or which relates to an area which will be of interest to you in your future career. Faculty will provide possible topics for your consideration.

Annotated Bibliography

You must submit an annotated bibliography by the end of week 3. Your bibliography must include at least 7 primary sources and least 8-10 additional web based resources, periodicals, interviews, or other resources. Your bibliography must be in APA citation style. Include a short paragraph after each reference, describing the content of the reference and how it pertains to the paper you are writing.

Weekly Status Reports

You must submit weekly status reports in the forums. Your status report should be at least ½ to 1 page long and should include details of the work you have completed towards your final paper. You may include additional information, such as an outline of your paper, several paragraphs or pages from your paper if you would like feedback on your paper as it is in progress.

First and Final Drafts of the Capstone Paper

You must submit the first draft of your paper by the end of week 5. To receive credit for this assignment, you must submit a complete paper, not a partially written paper. Your first draft will not be graded by the rubric, but helpful feedback, comments and guidance will be provided to indicate where you are falling short or where additional work is required. You can correct and improve your paper before resubmitting your final draft by the end of Week 7.

Final Capstone Paper

The final paper is due at the end of week 8. It must be 20-25 double-spaced pages, not including title page, abstract, references, appendices, figures or tables. Your paper must include a minimum of 7 primary sources and at least 8-10 additional web based resources, periodicals, interviews, or other resources. You must also include a title page, an abstract, and a bibliography page, written in APA style. Your final draft and final paper should be submitted to Turnitin.com for analysis and review. Turnitin.com will analyze a paper and report instances of potential plagiarism for review and editing before submitting it for a course grade. Faculty will require students to use Turnitin.com and they will provide the necessary codes for Turnitin.com access.

Capstone Briefing.

During Week 8, the student will make an oral presentation to selected members of the Math faculty. The presentation will be live and online. This will require a synchronous session and the faculty member will arrange this session. The student will present a lecture of 15-20 minutes with 30 minutes allowed for discussion and questions. The student lecture/briefing will describe and explain the research reported in the Capstone paper. The lecture and discussion will be recorded with Adobe Connect. The faculty member will advise the student in preparing his briefing and will be available for student rehearsals and practice sessions. The final graded presentation will be given to the faculty member and at least two additional Math faculty members.

Students' final grades will be posted within 7 days of the end of the semester. Please see the [Student Handbook](#) to reference the University's [grading scale](#).

The points earned on the graded course assessments will determine the course grade. The final grade in the course will be based on total points. Students must achieve a course grade of C or higher to be eligible for the BS Mathematics degree. Grades will be assigned based on the following graded assessments.

Grading:

Name	Points
Quizzes	0
Quiz 1 Basic Mathematics	8
Quiz 2 Core Mathematics	8
Quiz 3 Concentration Mathematics	8
Forums	0
Week 1 Introduction	1
Week 2 Status	1
Week 3 Status	1
Week 4 Status	1
Week 5 Status	1
Week 6 Status	1
Week 7 Status	1
Week 8 Final Reflections	1
Assignments	0
APUS Honor Code and Pledge	1
1 Topic selection	2
2 Annotated Bibliography	2
3 Paper Outline	2
4 First draft	2
5 Final draft	2
Capstone Paper	48
Capstone Presentation	10

Materials

Book Title: Students will be utilizing library resources and materials from previous MATH courses.

Author: N/A

Publication Info: N/A

ISBN: N/A

There are no required texts for this course. The student will work with the course textbooks used during their mathematics program and references in the APUS Online Library. The AMU/APU Library Guides provide access to collections of trusted sites on the Open Web and licensed resources on the Deep Web.

<http://apus.libguides.com/index.php>. There is a Mathematics Portal in the APUS Online Library located at

<http://apus.campusguides.com/Mathematics?hs=a>. This Program Portal contains topical and methodological resources to help launch research in the degree program. Useful links for this Capstone course in the Math Portal or are at the links below:

- Research Primer: http://apus.campusguides.com/APUS_ePress/research_primer
- Research Methodology: <http://site.ebrary.com/lib/apus/detail.action?docID=10413335>
- Purdue Online Writing Lab: <https://owl.english.purdue.edu/>
- APA Style Guide: <http://apus.campusguides.com/content.php?pid=205954&sid=3202561>
- Grammar and Punctuation: http://apus.campusguides.com/APUS_ePress/grammar_punctuation

Public domain web sites may be useful during the research and analysis phase. Students must abide by the university's academic honesty policy when citing references from the Library or Internet sources.

Supplementary references for this course are shown at the end of this syllabus.

Course Guidelines

Citation and Reference Style

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Tutoring

- [Tutor.com](http://www.tutor.com) offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

Late Assignments

- Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. The due date for each assignment is listed under each Assignment.
- Generally speaking, late work may result in a deduction up to 15% of the grade for each day late, not to exceed 5 days.
- As a working adult I know your time is limited and often out of your control. Faculty may be more flexible if they know ahead of time of any potential late assignments.

Turn It In

- Faculty may require assignments be submitted to Turnitin.com. Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

Academic Dishonesty

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services such as CourseHero.com. Additionally, allowing your work to be placed on such web services is academic dishonesty, as

it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

Submission Guidelines

- Some assignments may have very specific requirements for formatting (such as font, margins, etc) and submission file type (such as .docx, .pdf, etc) See the assignment instructions for details. In general, standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

Disclaimer Statement

- Course content may vary from the outline to meet the needs of this particular group.

Communicating on the Forum

- Forums are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the forum. The purpose of the forums is to actively participate in an on-going discussion about the assigned content.
- “Substantive” means comments that contribute something new and hopefully important to the discussion. Thus a message that simply says “I agree” is not substantive. A substantive comment contributes a new idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

University Policies

[Student Handbook](#)

- [Drop/Withdrawal policy](#)
- [Extension Requests](#)
- [Academic Probation](#)
- [Appeals](#)
- [Disability Accommodations](#)

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