COLLEGE COURSE PROPOSAL FORM

Instructions: Use this form for college course proposals and course content revisions.

Department/College: <u>Mathematical Sciences/Arts and Sciences</u>

Chairperson: ___ <u>Dr. Ralph Tucci</u> ___

Course Title: ___ <u>Computational Mathematics</u> _____ *(Limit 28 Characters or Less)*

Course Number: <u>M</u> <u>A</u> <u>T</u> <u>H</u> - <u>A</u> <u>3</u> <u>7</u> <u>5</u>

Term: ___ Fall _x_ Spring ___ Summer   Credit Hours: __3_ Major ___ Required ___ Elective

Effective Term <u>Fall 2016</u> Course I.D. (SUBJ-LEVL) _____ Contact Hours _____3_____

Grade Type (Normal or Pass/Fail): <u>Normal</u>   Maximum Capacity <u>30</u>

Activity Type (LEC, STU, LAB, LLB...)

Inter-disciplinary Classification (s) _____<u>None</u>_____

Common Curriculum Classification (s) __<u>None</u>_____

Pre-requisites/Registration Controls: Math A258 and COSC A211

_____

New Resources and Fees

   a. If this is a revised course, was there a course fee?   Yes_____ $_____

        No___X___

   b. Will a course fee be required for this course?   Yes_____ $_____

        No___X___

   c. Are new resources needed for implementing this course? Yes_____ No__X____
       If yes, provide descriptions and dollar amounts in Section V.

Course Description: (maximum 350 spaces)

This course develops the computational procedures fundamental to numeric applications. Topics include, but are not limited to, error analysis, numerical solutions of non-linear equations, least squares curve fitting, and numerical solutions of ordinary differential equations. It is a requirement for the Computational Mathematics major and the Computational Science minor.

Complete the following sections:

I. Justification for the course: provide a clear and compelling rationale for any proposed curriculum modification, including additions and deletions to the course inventory, changes in degree/program requirement, new degree programs, and other major curriculum revisions. The justification should state explicitly and clearly how the changes relate to the college and department plans.

Currently, the course has only MATH A257 and COSC A211 as prerequisites. The original rationale for this low requirement was that it would attract students from less mathematical majors to the Computational Science Minor. Since the level of the material is relatively basic, we decided that the course would not count as a 300-level course for mathematics majors. What we have seen since then is that we are not attracting new students to the minor. Most of the students in the minor are either physics or chemistry majors and are required to take Math A258, with or without the minor. The problem that we now have is that since our majors are excluded, enrollment numbers have been low. We propose changing the prerequisites to MATH A258 and COSC A211 and covering more advanced topics and thus making MATH A375 appropriate as a 300-level course that would be available to our mathematics majors.

II. Impact on the Curriculum:
    A. Review your current course offerings and requirements in light of the proposed change. How will the proposed change or changes improve your program and enhance the educational outcomes you seek to accomplish?

    The course will become a more robust elective and will be an additional option for mathematics majors.

    B. How will proposed change impact the major/adjunct/elective hour distribution requirement for the major or program?

    No change.

III. Impact of a new course on frequency of course offerings:
    A. Specify whether or not the offering of the new course will increase the number of courses or sections offered by the department during the semester in which this course is offered or during the following year;

    This is not expected.

    B. Specify, if there is no increase in the number of courses offered, which course(s) or section(s) will be dropped in a given semester to accommodate the frequency with which this course will be offered;

    NA

    C. Specify what effect the new course will have on enrollments in other courses or sections within the department and whether or not offering this course will prevent an important or required course from being offered in a given semester.

This is not a new course. We don't expect it to affect enrollment in other courses since we typically only offer one math elective per semester.

D. Is there a service learning component? If yes, please attach a memo from the director of service learning describing this component.

No

E. Explain how this proposal does or does not impact other departments, especially those serviced by your department or program and those that provide adjunct service to your department or program.

It will not affect physics or chemistry at all, since those students take Math A258 anyway. Majors from other departments will have to take and extra course, namely Math A258. But, so far, we have only had one student outside of physics and chemistry complete the minor.

F. Attach a complete functional syllabus for the course as outlined in the Syllabus Template & Policy Undergraduate and Non-Law Graduate Courses

IV. Attach a detailed plan for assessment of the proposed course that includes the following elements:
A. Student learning outcomes for this course that are tied to course content and assignments. Key Question: What do you want student to know or be able to do at the end of this course?

See attached syllabus

B. Methods, tools, instruments that will be employed to measure success. Describe methods for measuring inputs and outputs. Key Question: What the indicators of learning and course effectiveness?

See attached syllabus

C. Criteria that will be used to measure accomplishments or outcomes. Key Question: How will we know that we are having a positive impact on our students' learning?
See attached syllabus

D. Frequency and schedule of assessment of student learning in this course.
See attached syllabus
E. Describe mechanisms that will be in place to ensure continuous improvement of course.
F.

The department collects final exams from all math majors annually and assesses the effectiveness of instruction.

G. Impact of course on accreditation or certification.
None

V. Impact on the budget:
A. Staffing. Is current staffing sufficient or will new faculty be needed (whether full-time or part-time)?

No new faculty members are needed.

B. Library Support. Describe how library support will be affected by this proposal. Include name of library liaison and date this proposal was discussed with liaison.

Library support will not be affected.

C. Support services. Will the proposed change require additional support services (Media Services audio/visual: typing/secretarial, computer services, computer time)?
No

D. New equipment. Does the proposed change presuppose the purchase of new equipment or software, whether for support or instruction?

No new equipment is needed.

E. Is a student fee requested? If yes, provide justification and basis for amount.

No

F. Additional physical space. Does the proposed change require additional physical space (for classes or labs) or modifications of existing physical plant space?
No

Impact on other departments. How will the proposed change impact the staffing, equipment, and service budgets of other departments?

None

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COURSE SYLLABUS

Computational Mathematics (MATH A375) Section 001

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Instructor: Dr. Jeremy Thibodeaux   Spring 2016

Office Hours: WF: 11:30-12:30   **TR:** 11:00-12:00   (Or by appointment)
Office: Monroe 439
Phone: (504)-865-2656
Email: thibodea@loyno.edu

I.COURSE DESCRIPTION: This course develops the computational procedures fundamental to numeric applications. Topics include, but are not limited to, error analysis, numerical solutions of non-linear equations, systems of linear equations using direct and iterative methods, polynomial interpolation, quadrature, least-squares curve fitting, and numerical solutions of ordinary differential equations. The course will also serve as an introduction to the MATLAB programming language. This course is a requirement for the Computational Mathematics major and the Computational Science minor.

II. Prerequisites: *COSC A211, MATH A258*

II. REQUIRED TEXTBOOK: Numerical Methods. Algorithms and Applications. Laurene Fausett. ISBN: 0-13-031400-5

III. VIRTUAL LAB: Loyola has established a virtual computational science lab that will be available to students in this class. This virtual laboratory is loaded with the software we will use in this course, Matlab and Mathematica. The vlab works only on windows machines; it is available directly through the Mathematics Center computers and through http://www.loyno.edu/vlab in all other campus computer labs and through the internet.

V. ASSIGNMENTS: There will be at least 5 programming assignments which will integrate Matlab and Mathematica with the mathematical techniques introduced in the lectures. There will also be two in-class exams and a final exam, along with occasional quizzes.

Course Grade: The grade will be determined based on your performance on the programming assignments, quizzes/tests and final exam. Quizzes will be announced and unannounced. The programming assignments will account for 50% of your grade. Quizzes and exams will account for the other 50% of your grade.

The following grade scale will be used:
A = 93 – 100%
A- = 90 – 92%
B+ = 87 – 89%
B = 83 – 86%
B- = 80 – 82%
 C+ = 77 – 79%

C = 73 – 76%
C- = 70 – 72%
D+ = 67 – 69%
D = 60 – 66%
F = 59% or below

 To receive full credit on programming, they must be turned in on its due date. Every day that an assignment is late it will lose 10% of its grade. If you have a documented medical excuse for missing a quiz/test, your grade will be based the remaining quizzes/tests. If you do not have a documented excuse you will receive a zero. The final exam is cumulative.

ATTENDANCE: Attendance is mandatory. At the end of the semester grades will be dropped by the number of missing class days. For example, consider a student who achieved a 93 as final average and say this student missed four classes. This student's final average will be lowered to an 89 and will get B+ instead of an A..

DISABILTY SERVICES: Students with disabilities who wish to receive accommodations in this class should contact Disability Services at 865-2990 as soon as possible so that warranted accommodations can be implemented in a timely fashion. Disability Services are located in the Academic Resource Center, Monroe Hall 405.

BLACKBOARD: Academic instruction continues via Blackboard in the event of a University emergency. Students are required to log in to the class via Blackboard within 48 hours in the event of an emergency.