# General Education Assessment and Review Form – Mathematics (Group II) 4/15

Please attach/ submit additional documents as needed to fully complete each section of the form.

## I. Course Information

Department: Mathematics Course Number: M105

Course Title: Contemporary Mathematics

Type of Request: New One-time Only X Renew \* Change Remove
Rationale:

\*If course has not changed since the last review and is taught by the same tenure-track faculty member, you may skip sections III-V.

### justification for course level

Normally, general education courses will not carry pre-requisites, will carry at least 3 credits, and will be numbered at the 100-200 level.If the course has more than one pre-requisite, carries fewer than three credits, or is upper division (numbered at the 300 level or above), provide rationale for exception(s).

NA

## II. Endorsement / Approvals

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| --- | --- | --- |
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\* Instructor: Lauren Fern (course coordinator) Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date 01/14/2016
 Phone / Email: (406)-243-5398; fernl@mso.umt.edu
Program Chair: : Mathematical Sciences: Emily Stone Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_
Mathematical Science Chair: Emily Stone Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_
Dean: Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_

\*Form must be completed by the instructor who will be teaching the course. If the instructor of the course changes before the next review, the new instructor must be provided with a copy of the form prior to teaching the course.

## iii. Description and Purpose

General Education courses must be introductory and foundational within the offering department or within the General Education Group. They must emphasize breadth, context, and connectedness; and relate course content to students’ future lives: See [Preamble](http://umt.edu/facultysenate/archives/minutes/gened/GE_preamble.aspx)

Contemporary Mathematics is an introduction to mathematical ideas and their impact on society. We introduce students to the vitality of mathematics and convey the power of mathematics as it surrounds them in their lives. Additionally, this course presents the quantitative tools necessary to understand issues arising in our daily lives as well as teaching the skills needed to be critical thinkers and informed decision makers. Topics studied include data analysis, elementary probability and statistical concepts, finance (credit cards, loans, and investments), problem solving and basic logic as well as other aspects of contemporary mathematics.

## iv. Criteria

Briefly explain how this course meets the criteria for the group.

Any course which satisfies the mathematical literacy requirement must have as its primary goal to teach mathematical reasoning and problem solving at a college level. Department of Mathematical Sciences approval is required.

M105 clearly satisfies the mathematical literacy requirement.

**1. An appreciation of the beauty of mathematics.**

While beauty is a relative term, the students in this course certainly gain an appreciation of how effective, applicable and widespread the use of mathematics is in daily life, as well as in places that they may never have thought (nature, art, music,…).

**2. An ability to apply mathematical reasoning.**

Because this is an applications based course, the students are continually confronted with word problems; these first need to be read and understood, then “translated” into mathematical statements. Next the students need to devise a plan in which to solve, carry out the plan, and then look back and examine their solution. Once this procedure is learned, it is used continually throughout the course.

**3. An understanding of how mathematics and statistics are used in many arenas.**

This is actually the heart of this course. The students are introduced to a variety of topics and ideas in order to gain an appreciation and understanding of mathematics to help them fully participate in the twenty-first century as informed citizens.

## v. Student Learning Goals

Briefly explain how this course will meet the applicable learning goals.

Upon completion of the mathematical literacy requirement, a student will be able to apply effectively mathematical or statistical reasoning to a variety of applied or theoretical problems.

The primary learning outcomes for this course include the following:

1. Read mathematical material and write using mathematical notation correctly.
2. Think and reason mathematically in order to function more effectively in the modern world.
3. Examine ways in which mathematics is used, follow and understand logical arguments, and to solve applied quantitative problems.
4. Formulate a problem precisely, interpret solutions, and make critical judgments.
5. Understand and explain elementary probability concepts and phenomena: including sample spaces with equally likely outcomes, the basic parameters (mean, standard deviation), the normal distribution, and a qualitative view of the Central Limit Theorem.
6. Understand and explain elementary statistical concepts, such as data description, statistical estimation, randomization, and statistical inference.
7. Explore and examine several other aspects of contemporary mathematics. This could include, but is not limited to, management science (e.g. graph models for network problems), social choice and decision making (e.g. elections, voting, fair division, Congress apportionment), or applied geometry (e.g. symmetry, tilings, growth rates).

The aforementioned learning outcomes thoroughly satisfy the General Education goals for Mathematics. Students firsthand witness the applicability of mathematics and continually apply it to a variety of applications. They learn problem solving throughout the course as they not only have to learn the techniques for each method, but also have to negotiate their way through various exercises and, on their own, need to determine the most appropriate method to solve the problem at hand.

## vi. Assessment

How are the learning goals above measured? Describe the measurement(s) used, such as a rubric or specific test questions that directly measure the General Education learning goals. Please attach or provide a web link to the rubric, test questions, or other measurements used.

All sections of this class used multiple assessments including hourly exams, quizzes, projects, as well as online and/or written homework. Under the subheading “Assessment Findings” is a sample of the assessment questions that were given along with the numbered learning outcomes they relate to (they are numbered 1-7 as indicated in part V above).

### Assessment Findings

**What were the results/findings, and what is your interpretation/analysis of the data?** (Please be detailed, using specific numbers/percentages when possible. Qualitative discussion of themes provided in student feedback can also be reported. Do NOT use course grades or overall scores on a test/essay. The most useful data indicates where students’ performance was stronger and where it was weaker. Feel free to attach charts/tables if desired.)

This assessment is based upon performance of the students in all of the sections of M105. Below each of the questions, the following is listed:

\* the numbered learning outcomes the questions relate to (they are numbered 1-7 as indicated in part v above).

 \* the average performance of the students on this question (out of 10 points).

1. For a given set of data, find the 5 number summary

 1) Min =

 2) Q1 =

 3) Median =

 4) Q3 =

 5) Max =

**Learning Outcome(s) Satisfied: #1, 6**

**AVERAGE: 9.2**

2. Suppose you invest $10,000 in an account that pays an APR of 4%. What is the value of the account in 5 years if interest is compounded monthly?

**Learning Outcome(s) Satisfied: #2, 4, 7**

**AVERAGE: 8.9**

3. Suppose your VISA card calculates finance charges using an APR of 24%. Your statement showed a previous balance of $500, in which you made a payment of $300. You then purchased some books for $175, which you charged on your VISA.

(a) Compute your finance charge.

**Learning Outcome(s) Satisfied: #1, 3, 7**

**AVERAGE: 9.4**

(b) Compute your new balance.

**Learning Outcome(s) Satisfied: #1, 3, 7**

**AVERAGE: 7.9**

4. What is the mode for a set of normally distributed data?

**Learning Outcome(s) Satisfied: #5**

**AVERAGE: 7.5**

### Assessment Feedback

Given your students’ performance the last time the course was offered, how will you modify the course to enhance learning? You can also address how the course could be improved, and what changes in the course content or pedagogy you plan to make, based upon on the findings. Please include a timeframe for the changes.

All sections of 105 covered common topics on probability, statistics, and personal finance. Any additional topics were left to the discretion of the individual instructors. Some of the additional topics covered were: art, number theory, logic, voting methods, tessellations and graph theory. Giving the instructors some flexibility with topics, while having some core topics that everyone covered, seemed to work well. The students tend to enjoy the finance portion of the course the most due to the relevance to their lives.

This semester the students performed better than what has been observed in previous semesters. As always they tend to do better on problems that are more ‘cookbook’ and have more difficulty on those that require translation, interpretation and multiple steps; or are more conceptual in nature.

There are quite a few challenges in teaching this course. One is that the student population who take this class tends not to have very much mathematical background; and while we only require a bare minimum, that can still be an issue for some. Relating to this, many of the 105 classes have students that have very little mathematical background, while other students in the class are actually quite proficient at the math. Being able to teach a class on such a wide spectrum is a true challenge. As Instructors we want to be able to effectively teach to the folks on one end, yet at the same time, challenge those at the other end. Third, many of the students who take this course have had less than desirable experiences in their past math classes. Hence, changing the attitudes of these students so that they are willing to open their minds and actually be open to learn and enjoy the material is quite challenging. Lastly, there is really no “perfect” text for this class. It is important that we provide a text at the appropriate level for our students that has many “real-world” applications. Yet, covering more esoteric topics (such as fractals, the notion of infinity, math and nature) can really stimulate the students and make them aware of the awesome beauty of mathematics. Finding a text that meets all of these criteria is a challenge. This past term we adopted a 2nd edition of a text that seems to go over well with the students as well as the Instructors. The new online program it uses had many glitches though. I am currently working with the folks who developed the program to clear many of the ‘bugs’ away.

A General Education Assessment Report will be due on a four-year rotating cycle. You will be notified in advance of the due date. This will serve to fulfill the University’s accreditation requirements to assess general education.

## vii. Syllabus

Please attach or submit syllabus in a separate file. The learning goals for the Mathematics Group must be included on the syllabus.

The syllabus for this course is included below:

# Syllabus for Online MATH 105 Contemporary Mathematics

## Professor Contact**:**

* Course Lecturer: Lauren Fern
* Phone: 406.243.5398
* Office: Math 205B
* E-Mail: fernl@mso.umt.edu

## [Catalog Description](from%20http%3A/www.umt.edu/catalog/mathsci.htm):

(from <http://www.umt.edu/catalog/mathsci.htm>)

**U 105 Contemporary Mathematics 3 cr.** Offered every term. Prereq., MATH 095D or appropriate placement score. An introduction to mathematical ideas and their impact on society. Intended for students wishing to satisfy the general education mathematics requirement.

## Learning Outcomes:

1. To attain some degree of mathematical literacy, including an ability to read mathematical material and write using mathematical notation correctly. To develop skills to think and reason mathematically in order to function more effectively in the modern world.
2. To examine ways in which mathematics is used, to follow and understand logical arguments, and to solve applied quantitative problems. This includes learning to formulate a problem precisely, to interpret solutions, and to make critical judgments in the face of competing formulations and solutions.
3. To understand elementary probability concepts and phenomena: including sample spaces with equally likely outcomes, the basic parameters (mean, standard deviation), the normal distribution, and a qualitative view of the Central Limit Theorem.
4. To understand elementary statistical concepts, such as data description, statistical estimation, randomization, and statistical inference.
5. To explore and examine several other aspects of contemporary mathematics. This could include, but is not limited to, management science (e.g. graph models for network problems), social choice and decision making (e.g. elections, voting, fair division, Congress apportionment), or applied geometry (e.g. symmetry, tilings, growth rates).

**General Education Learning Outcomes:**

Upon completion of the mathematical literacy requirement, a student will be able to effectively apply mathematical or statistical reasoning to a variety of applied or theoretical problems.

## Notes About the Course:

This course is designed to illustrate several ways in which mathematics is used in the “real world”. We will explore some topics of general interest which are not typically taught in a formal mathematics class. The goal is for you to see not only how useful mathematics is, but also how beautiful and elegant it can be.

## Textbook:

*Quantitative Literacy, 2nd ed*. Crauder. An access code to LaunchPad is necessary to participate in this class.

## Orientation:

M105 online utilizes LaunchPad as an innovative way to do homework and testing with immediate feedback; LaunchPad also keeps you on task and using your developing math skills. This program works best using either Firefox or Chrome. There can be glitches using internet explorer. Every section of the text covered in class has a corresponding assignment in LaunchPad. There is also a chapter quiz for each of the chapters covered in class and 3 exams throughout the semester. Note that all of the homework, quizzes and exams are grouped together; however I suggest you go in order (i.e. after completing chapter 1 homework, do the chapter 1 quiz. Similarly, after completing the chapter 2 homework and quiz, you should take exam 1 which covers both chapters 1 and 2).

All assignments and communication will take place inside the LaunchPad environment. Once you have registered for LaunchPad, you will be able to access assignments, view course materials, check your grades, utilize their resources and send email messages. I expect you to use email as your primary means of communicating with me. If you have difficulty using the software, you should consider taking this class in a different format.

This semester I have opted out of having specific due dates for the homework, tests and quizzes. You will notice that everything has a due date of December 21, the Monday after finals week. This DOES NOT mean that you should wait until the last moment to work on your assignments. I assure you this is a quick way to place yourself in a less than optimal position to complete the course with any measure of success. You may ask why I have chosen to do this. There are multiple reasons. Part of the beauty of an online course is the fact that it is self-paced and can be studied on your time, not necessarily during typical school time. I also realize that we have lives going on outside of school and things may come up where one has to focus on other matters. While I can give extensions, that seemed to stress many students out, and the idea of stressing over an artificial deadline is senseless (PLEASE note that Dec. 21 is NOT an artificial deadline!!!!). This leads to my last reason which is that I would much rather spend time helping people learn math than sitting at my computer switching due dates!

**Suggestions/Advice:**

1. It is strongly recommended that you check your campus email biweekly.
2. You should begin each chapter by reading the assigned sections in your text book and watching the corresponding section videos. Some students find it useful to watch the videos first, and then read the text (and maybe watch the videos again). Please note that I have videos posted on our Moodle page where I go through a lot of the material. LaunchPad also has a TON of resources that you should take advantage of.
3. Homework should be done daily. There is no time limit on homework assignments. You can attempt the same question up to 4 times and still receive full credit. Use your notes from the videos as well as your text book when needed. You will receive a 100% grade for homework if all of the questions are answered correctly. Additional online practice homework questions can be found under Chapter Contents in the Study Plan. Homework from the text is for practice purposes and will not be graded.
4. If any questions arise, PLEASE contact me. Your success in this course will depend upon the amount of time and effort you are willing to spend with the material. You should plan to spend at least six hours per week reading your text, reviewing notes, working on homework, completing quizzes, and studying for exams.
5. It is assumed that you are able to use the basic features of your calculator and that you have a working knowledge of all material covered in the prerequisite course. While I understand that some of the material was not mastered by all students in the prerequisite course or that the prerequisite course was taken years ago, it is your responsibility to seek assistance if it is needed. You should start by reading the textbook and its examples. You will find that the material comes back quickly. You are strongly encouraged to ask questions.
6. The following link: <http://cmg.screenstepslive.com/s/MacmillanMedia_StudentHelp/m/LaunchPadSM> will access the LaunchPad student help manual should you have any technical issues. There is also technical support available via email or 800-936-6899. They are super helpful!

## Grading:

Your course grade will be based on 3 exams( 42.86% of your grade), 6 quizzes(28.57% of your grade) and 23 homework assignments(28.57% of your grade). There is no final exam.

| *Grade* | *Grading Scale by Percentages* |
| --- | --- |
| A | 85%+ |
| B | 84-75% |
| C | 74-60% |
| D | 59-50% |
| F | Less than 50% |
| CR |  |

\*\*\* If you are taking this course as a general education requirement, you must take it for a traditional letter grade (not CR/NCR). A grade of “D-“is considered passing and will earn you credit for the course, BUT it will NOT fulfill your general education requirement and you will have to re-take the class\*\*\*. A grade of **C or better** is needed to fulfill the math literacy requirement.

## Add/Drop Policy:

The last day to add/drop or change grading option to Audit by Cyberbear is **9/21.** The last day to change sections and to change grading options is **11/2.**This is also the last day to drop. Changes after this deadline and until **12/11** must be done by Petition to Drop/Add after deadline and approved by me, your advisor and the appropriate Dean. Approval requires genuine extenuating circumstances as listed in the university catalog.

 Extenuating circumstances are:

1. Missing a substantial number of classes due to illness, accident or family emergency.
2. A change in work schedule that makes it impossible to attend class or devote adequate time to the course.
3. Registration in the course by error and never attending class.

 Reasons that are not satisfactory include:

1. Forgetting to turn in a drop slip.
2. Protecting your grade point average.

Incomplete (I) Grades:

To be eligible for an “I”, the following conditions must be met:

1. The student must have been in attendance and **passing** the course up to 3 weeks before the
2. semester ends; and
3. The student is unable to complete the course due to extenuating circumstances, which usually means serious illness or death in the family.

 Incompletes are not given under any other circumstances and are always given at the discretion of the instructor. See the 2015-2016 catalog for further information.

## Misconduct:

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the [Student Conduct Code](http://www.umt.edu/SA/VPSA/index.cfm/page/1321). Available for review online at <http://www.umt.edu/SA/VPSA/index.cfm/page/1321>.

Cheating will not be tolerated! You are expected to personally complete any work that is submitted with your name on it. While I encourage students to discuss homework solutions, you should not discuss particular solutions to questions that will be graded. Instead, find a similar question to discuss or use an example from the textbook or notes. It is never acceptable to copy another person’s work or to allow another student to copy your work.

## Special Accommodations:

Students with disabilities will receive reasonable accommodations in this online course. To request course modifications, please contact me as soon as possible. I will work with you and Disability Services in the accommodation process. For more information, visit the [Disability Services website](http://life.umt.edu/dss/) or call 406.243.2243 (Voice/Text).