Department of Information Sciences and Technology

Course Syllabus

IT 196 - Review of IT Problem Solving Using Computer Programming

revised 11.25.2015

Catalog Description

Provides a self-paced, comprehensive review of techniques for developing solutions to business problems through a structured, iterative design and development approach. Open only to students with transfer credit comparable to IT 106 who have not attempted IT 106 or IT 196.

Prerequisites

Permission of department. Students must have transferred a course comparable to IT 106 in order to be eligible to register for this course. For VCCS students, this course is typically ITP 120.

This requirement will be strictly enforced. Any student who does not meet the prerequisite requirement will not be permitted to enroll in the course.

Important Advising Note: Students may find this course to be very challenging! Only students with a solid foundation of the content covered in IT 106 should attempt to complete this course. This course is not intended to replace the full content and experience gained from completing IT 106. Students should consult with an advisor if they are unsure if they should register for this course or for IT 106.

Rationale

Problem solving and programming are essential skills for all IT students and IT professionals. Understanding how a computer is instructed to accomplish tasks leads to an appreciation of the underlying concepts of the Information Technology discipline. Learning how to solve a problem using a structured programming language provides a strong foundation that will be used in higher level IT courses.

This course provides a pathway for students that have previously taken a course comparable to IT 106, but were denied direct equivalency to IT 106 to review materials and reinforce what was learned in the prior course. From this learning they should be able to demonstrate a level of proficiency equivalent to students completing IT 106 which will prepare
the student for higher level IT courses.

**Course Outcomes**

1. Utilize primitive data types and built-in data structures.
2. Use procedural programming techniques effectively and efficiently (including expressions, decisions, repetition structures, methods, parameters, arrays and variable scope).

**Supported Student Outcomes at the Program Level**

(a) Apply knowledge of computing and mathematics
(c) Design, implement and evaluate a computer-based system, process, component, or program
(j) Ability to use and apply current technical concepts and practices in the core information technologies

**Major Topics**

On successful completion of this course, students will be able to:

- Discuss the importance of algorithms in the problem-solving process.
- Identify the necessary properties of good algorithms.
- Create algorithms for solving simple problems.
- Use a programming language to implement, test, and debug algorithms for solving problems.
- Define and use data of both primitive and reference types effectively.
- Create and use simple and complex static data structures.
- Design solutions to problems using procedural techniques.
- Decide on an appropriate repetition and/or selection structures for given problems.
- Apply the techniques of structured (functional) decomposition to break a program into smaller pieces.
- Describe the mechanics of parameter passing and the issues associated with scoping.
- Apply effective debugging strategies.
Textbooks

** BOTH TEXTBOOKS ARE REQUIRED **

By: Lesley Anne Robertson
Publisher: Course Technology
Publication Date: September 29, 2006
ISBN: 978-1-4239-0132-7

** BOTH TEXTBOOKS ARE REQUIRED **

Big Java Late Objects
By: Cay S. Horstmann
Publisher: John Wiley & Sons, Inc.
Publication Date: February 1, 2012
ISBN: 978-1-118-08788-6

Administrative Support

Fairfax Campus
   Nguyen Engineering Building, Room 5400
   Phone: 703-993-3565

Science and Technology Campus
   Bull Run Hall, Suite 102
   Phone: 703-993-8461

For a map and directions, visit: http://maps-directions.gmu.edu/
Grading

Grades will be awarded in accordance with the GMU Grading System for undergraduate students. See the university catalog for policies: http://catalog.gmu.edu for more information.

The grading scale for this course is:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
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<tbody>
<tr>
<td>73 – 100%</td>
<td>S</td>
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<tr>
<td>0 – 72%</td>
<td>NC</td>
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</tbody>
</table>

Passing/Satisfactory  Failing/No Credit

Raw scores may be adjusted by the instructor to calculate final grades.

Final grades will be determined based on the following components:

<table>
<thead>
<tr>
<th>Graded Activity</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Final Exam</td>
<td>100%</td>
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</table>

There are no extra credit opportunities. Students may not do additional work nor resubmit any graded activity to raise a final grade.

The final exam will be conducted on-campus, in a classroom as follows: Wednesday, 1/14/15, 09:00am – 11:45am, Fairfax, Engineering Building, Rm. 5358. You must be available during this day/time to take the exam. The exam will be written and “closed book, closed notes, closed friends” – no reference materials other than those provided with the exam will be permitted. Exams are retained by the IST department and will not be returned to students.

Final grades will be posted to PatriotWeb, which is the only vehicle for students to obtain those grades. A student with a "hold" on his/her PatriotWeb account will be unable to access final grades until the hold has been removed by the Registrar.
Course Content

<table>
<thead>
<tr>
<th>Module</th>
<th>Content</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to Problem Solving (Program design, Pseudocode, and Algorithm Development)</td>
</tr>
<tr>
<td>2</td>
<td>Introduction to Programming and Fundamental Data Types</td>
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<tr>
<td>3</td>
<td>Problem Solving with Selection Control Structures and Decision Statements / Validating User Input</td>
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<tr>
<td>4</td>
<td>Problem Solving with Repetition Control Structures and Loop Statements</td>
</tr>
<tr>
<td>5</td>
<td>Pseudocode Algorithms Using Sequence, Selection, and Repetition</td>
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<tr>
<td>6</td>
<td>Array Processing</td>
</tr>
<tr>
<td>7</td>
<td>Mid-Point Review</td>
</tr>
<tr>
<td>8</td>
<td>Modular Programming/Methods</td>
</tr>
<tr>
<td>9</td>
<td>More on Methods &amp; Parameters and Variable Scope</td>
</tr>
<tr>
<td>10</td>
<td>Translation of Significantly-Sized Algorithms Into Programs</td>
</tr>
<tr>
<td>11</td>
<td>Arrays and Methods / ArrayLists</td>
</tr>
<tr>
<td>12</td>
<td>Problem Solving Using Parallel and Multi-Dimensional Arrays</td>
</tr>
<tr>
<td>13</td>
<td>Problem Solving Using Arrays in Significantly-Sized Problems</td>
</tr>
<tr>
<td>14</td>
<td>Final Exam Review</td>
</tr>
</tbody>
</table>

Important Dates

Dates for adding, dropping the course, etc. are available via: http://registrar.gmu.edu.

Religious Holidays

A list of religious holidays is available on the University Life Calendar page. Any student whose religious observance conflicts with a scheduled course activity must contact the instructor at least 2 weeks in advance of the conflict date in order to make alternative arrangements.

Attendance Policy

This course is a self-paced course with no graded assignments other than a final exam. Students are strongly recommended to follow the course schedule to ensure they remain on target to successfully complete the course.
Departmental policy requires students to take exams at the scheduled time and place, unless there are truly compelling, severe circumstances supported by appropriate documentation. Except in such circumstances, failure to arrive to the exam site on time for a scheduled exam will result in a score of zero (0) for that exam, in accordance with Mason policy on final exams. Students should not make travel plans or other discretionary arrangements that conflict with scheduled classes and/or the final exam period listed on the Registrar’s website. If the University is closed due to weather or other unforeseen conditions, final exams may be rescheduled – students are strongly advised not to make plans that would prevent them from attending exams that may be rescheduled during the entire exam period.

Communications

Registered students will be given access to a section of the Blackboard Learning System for this course. Blackboard will used as the primary mechanism to disseminate course information, including announcements, lecture slides, and grades.

Communication with the instructor on issues relating to the individual student should be conducted using Blackboard Mail, GMU email, via telephone, or in person - not in the public forums on Blackboard. GMU Mail is the preferred method – for urgent messages, you should also attempt to contact the instructor via telephone. Federal privacy law and GMU policy require that any communication with a student related in any way to a student’s status be conducted using secure GMU systems – if you use email to communicate with the instructor you MUST send messages from your GMU email account.

Privacy

Instructors respect and protect the privacy of information related to individual students. As described above, issues relating to an individual student will discussed via email, telephone or in person. Instructors will not discuss issues relating to an individual student with other students (or anyone without a need to know) without prior permission of the student.

Faculty and staff will take care to protect the privacy of each student's scores and grades.

Disability Accommodations

The Office of Disability Services (ODS) works with disabled students to arrange for appropriate accommodations to ensure equal access to university services. Any student with a disability of any kind is strongly encouraged to register with ODS as soon as possible and take advantage of the services offered.
Accommodations for disabled students must be made in advance – ODS cannot assist students retroactively, and at least one week’s notice is required for special accommodations related to exams. Any student who needs accommodation should contact the instructor during the first week of the semester so the sufficient time is allowed to make arrangements.

**Honor Code**

All members of the Mason community are expected to uphold the principles of scholarly ethics. Similarly, graduating students are bound by the ethical requirements of the professional communities they join. The ethics requirements for some of the communities relevant to Applied IT graduates are available via the following links:

- [ACM Code of Ethics and Professional Conduct](#)
- [IEEE Code of Ethics](#)
- [EC-Council Code of Ethics](#)

On admission to Mason, students agree to comply with the requirements of the [GMU Honor System and Code](#). The Honor Code will be rigorously enforced in this course. The instructor will use several manual and automated means to detect cheating and/or plagiarism in any work submitted by students for this course, and to direct teaching assistants and/or other faculty and/or staff members to do likewise in support of this course.

For this course, the following additional requirements are specified:

- All work that is to be submitted for a grade must be prepared by the individual student. Students are expressly prohibited from sharing any work that is to be submitted for a grade for this course in any manner with anyone other than the instructor and teaching assistant(s) assigned to this course and the student's section).

- Students may not post or share course content (i.e. instructor provided lecture notes, assignment directions, assignment questions, or anything not created solely by the student), using any non-electronic or electronic medium (i.e. web site, FTP site, any location where it is accessible to someone other than the individual student, instructor and/or teaching assistant(s)). Such action constitutes copyright infringement and is strictly prohibited without prior approval from the instructor.

If you have questions on these requirements, please discuss them with your instructor. Any deviation from these requirements is considered a violation of the Honor Code. All suspected violations of the Honor Code will be taken seriously and are required to be reported by the instructor.