Catalog Description
Introduces use of procedural programming as an IT resource for developing solutions to business problems. Emphasizes techniques & practices for design of solutions. Includes use of expressions, scalar data types, control structures as well as use of IDEs for development and debugging.

Prerequisites
The prerequisite for this course is IT 103 (or an approved equivalent course). A grade of "C" or better must be achieved in the prerequisite course before a student is qualified to take this course. The prerequisite course must be completed prior to, not concurrently with, this course.

This requirement will be strictly enforced. Any student who does not meet the prerequisite requirement will be dropped from the course by the instructor at the start of the semester and the student will be responsible for any consequences of being dropped.

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 Database, Security, Web Development and Networking courses.

Educational Objective
To introduce students to problem solving with a procedural approach using a high-level programming language as a tool.

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
http://eagle.gmu.edu/map/buildings/engineering.php, Room 5400
Phone: 703-993-3565

Prince William campus
Bull Run Hall, Suite 102
Phone: 703-993-8461
Grading

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

The grading scale for this course is:

<table>
<thead>
<tr>
<th>Grade Range</th>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>97 – 100%</td>
<td>A+</td>
<td>Passing</td>
</tr>
<tr>
<td>93 – 96%</td>
<td>A</td>
<td>Passing</td>
</tr>
<tr>
<td>90 – 92%</td>
<td>A-</td>
<td>Passing</td>
</tr>
<tr>
<td>87 – 89%</td>
<td>B+</td>
<td>Passing</td>
</tr>
<tr>
<td>83 – 86%</td>
<td>B</td>
<td>Passing</td>
</tr>
<tr>
<td>80 – 82%</td>
<td>B-</td>
<td>Passing</td>
</tr>
<tr>
<td>77 – 79%</td>
<td>C+</td>
<td>Passing</td>
</tr>
<tr>
<td>73 – 76%</td>
<td>C</td>
<td>Passing</td>
</tr>
<tr>
<td>60 – 72%</td>
<td>D</td>
<td>Passing*</td>
</tr>
<tr>
<td>0 – 59%</td>
<td>F</td>
<td>Failing</td>
</tr>
</tbody>
</table>

A grade of "D" is considered a passing grade for undergraduate courses. However, a minimum grade of "C" is required in the BSIT program for any course that is a prerequisite for one or more other courses. This course is a prerequisite for several courses in the IT program. Please see http://ait.gmu.edu for additional information.

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>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Exercises</td>
<td>15%</td>
</tr>
<tr>
<td>• For online sections, 5% of this portion of the grade will come from Discussion Board participation</td>
<td></td>
</tr>
<tr>
<td>Homework Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
</tr>
</tbody>
</table>

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

Late submissions will not be accepted for any graded activity, unless there are truly compelling, severe circumstances supported by appropriate documentation.

The midterm and final exam will be conducted on-campus, in a classroom. The dates/times/locations will be posted on Blackboard as soon as possible. The exams 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 AIT 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>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Problem Solving</td>
</tr>
<tr>
<td>2</td>
<td>Introduction to Programming and Fundamental Data Types / Creating Graphical User Interfaces</td>
</tr>
<tr>
<td>3</td>
<td>Problem Solving with Selection Control Structures and Decision Statements / Validating User Input</td>
</tr>
<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>
</tr>
<tr>
<td>6</td>
<td>Array Processing</td>
</tr>
<tr>
<td>7</td>
<td>Midterm Review / Midterm Exam</td>
</tr>
<tr>
<td>8</td>
<td>Modular Programming / Methods</td>
</tr>
<tr>
<td>9</td>
<td>More on Methods / 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 Arrays and Methods</td>
</tr>
<tr>
<td>13</td>
<td>Parallel and Multi-Dimensional Arrays</td>
</tr>
<tr>
<td>14</td>
<td>Problem Solving Using Arrays in Significantly-Sized Problems</td>
</tr>
<tr>
<td>15</td>
<td>Recursive Methods / Final Exam Review / Final Exam</td>
</tr>
</tbody>
</table>

**Important Dates**

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

**Religious Holidays**

A list of religious holidays is available on the [University Life Calendar page](http://registrar.gmu.edu). Any student whose religious observance conflicts with a scheduled course activity must contact the instructor [at least 2 weeks in advance](http://registrar.gmu.edu) of the conflict date in order to make alternative arrangements.
**Attendance Policy**

Students are expected to attend each class, to complete any required preparatory work (including assigned reading) and to participate actively in lectures, discussions and exercises. As members of the academic community, all students are expected to contribute regardless of their proficiency with the subject matter. The instructor reserves the right to issue pop quizzes if adequate attendance is not maintained.

Students in face-to-face sections are also expected to attend each lab, to complete hands-on activities and exercises. Each lab will require the student to sign-in to indicate their presence. Labs contain a “present for credit” policy. Students must be present for the duration of the lab to have their lab submission graded. **Students that leave lab before completing the lab’s activities or do not attend lab will earn a grade of zero (0) for the lab, even if they complete the lab on their own, outside of class.**

Students are expected to make prior arrangements with their instructor if they know in advance that they will miss any class or lab and to consult with the instructor as soon as possible if they miss any class or lab without prior notice. Any student who expects to miss more than one class or lab session is strongly advised to drop the course and take it in a later semester when he/she can attend every class and lab.

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 exams. 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.

**Classroom Conduct**

Whether the course is face-to-face or online, students are expected to conduct themselves in a manner that is conducive to learning, as directed by the instructor. Any student who negatively impacts the opportunity for other students to learn will be warned – if disruptive behavior continues, the student will be removed from the course.
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 (outside of lectures) to disseminate course information, including announcements, lecture slides, assignments, 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.

All course materials (lecture slides, assignment specifications, etc) are published on Blackboard in Adobe® Portable Document Format (PDF) or in a format for which a free reader is available (such as Microsoft PowerPoint). This allows users of most computing platforms to view and print these files. Microsoft® Word (or a compatible word processing application) is required for preparing assignments – it is available on computers in the Mason open labs.

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.

Graded work other than exams will be returned to individual students directly by the instructor (or by a faculty or staff member or a teaching assistant designated by the instructor or via another secure method). Under no circumstances will a student's graded work be returned to another 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\(^1\). The Honor Code will be strictly enforced in this course. Honor Code cases are heard by a panel consisting of students – students who meet the requirements are encouraged to nominate themselves to serve on the Honor Committee. Any use of the words or ideas of another person(s), without explicit attribution that clearly identifies the material used and its source in an appropriate manner, is plagiarism and will not be tolerated. Within The Volgenau School there is a mandated "zero tolerance" policy for plagiarism. The instructor reserves the right to use all manual and/or automated means (including, but not limited to such services as Safe Assign and MOSS – Measure of Software Similarity) to detect 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. Additional information on the enforcement of the George Mason University Honor Code policy can be found at: academicintegrity.gmu.edu.

For this course, the following requirements are specified:

\(^1\) Available at www.gmu.edu/catalog/apolicies and related GMU Web pages.
- All work that is to be submitted for a grade must be prepared by the individual student. Students are expressly prohibited from sharing any graded work 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. Specifically, students may not do the following, including but not limited to:
  - Discussing the work specific to an assignment with anyone except the instructor and/or teaching assistant(s)
  - Showing another student their work-in-progress, completed solution, or graded solution
  - Having another person (i.e. current student, former student, tutor, friend, anyone) “walk them through” how to solve an assignment

- All work must be newly created by the individual student for this course for this semester. Any usage of work developed for another course, or for this course in a prior semester, is strictly prohibited without prior approval from the instructor.

- Posting or sharing 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)) constitutes copyright infringement and is strictly prohibited without prior approval from the instructor.

Students may (and are encouraged to) seek assistance from others (i.e. other students, peer advisors, outside tutors, etc.) for CONTENT assistance ONLY that is not related to any graded work. Peer advisors may not assist a student with the completion of graded work.

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.