Information Sciences and Technology
Department
Course Syllabus
IT 102 Discrete Structures
created 1.10.2016

Catalog Description
Introduces ideas of high-level pseudocode and discrete structures. This course focuses on problem-solving, supporting both abstraction and modeling providing the foundation needed for programming.

Prerequisites
A minimum score of 13 on the Algebra I section of the Mathematics Placement Test or C or better in MATH 108 or MATH 108 as a co-requisite. Prerequisite enforced by registration system.

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.

Course Outcomes
1. Students will apply the concept of Sets to common datatypes used in programming languages and use variables of those datatypes.

2. Students will be able to identify the domain and range of mathematical functions. Students will define and use functions in programs and understand the concept of recursion. Students will implement pre-defined functions by investigating a current language API.

3. Students will be able to identify Arithmetic and Geometric Sequences and determine terms and/or sums of terms within those sequences. Students will select the correct repetition structure and implement iterations in programs.

4. Students will be able to apply concepts of logic and truth tables to expressions and Digital Circuits. Students will apply Boolean Algebra concepts to create robust selection statements in programs.

5. Students will be able to calculate probabilities, permutations and combinations.

6. Students will be able to identify graphs of and plot basic trigonometric functions. Students will be able to simplify expressions using trigonometric identities.
ABET Accreditation

As a required course in the BSAIT curriculum, Discrete Structures strongly supports several of the program’s student outcomes. Assessment data is gathered from student artifacts in this course to partially verify that students are achieving the following outcomes:

Outcome (a): An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline.
(Student Outcomes: 1, 2, 3, 4, 5, 6)

Outcome (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
(Student Outcomes: 1, 2, 3, 4, 5)

Outcome (h) Recognition of the need for and an ability to engage in continuing professional development
(Student Outcomes: 2)

Outcome (i): An ability to use current techniques, skills, and tools necessary for computing practice
(Student Outcomes: 6)

Outcome (j) An ability to use and apply current technical concepts and practices in the core information technologies.
(Student Outcomes: 5, 7, 8, 9)

Textbook

There is no required textbook for this course:
Faculty and Staff

Instructor and Course Coordinator:

Irene Bruno  
Associate Professor IST Department  
Phone: 703-993-8541  
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Instructors  
Jonathan Hsu (jhsu@gmu.edu)  
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Administrative support:

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

Prince William campus  
Cindy Woodfork  
Bull Run Hall, Suite 102  
Phone: 703-993-3565

Grading

The grading scale for this course is:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Letter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>99 – 100%</td>
<td></td>
<td>Passing</td>
</tr>
<tr>
<td>A</td>
<td>92 – 98%</td>
<td></td>
<td>Passing</td>
</tr>
<tr>
<td>A-</td>
<td>90 – 91%</td>
<td></td>
<td>Passing</td>
</tr>
<tr>
<td>B+</td>
<td>88 – 89%</td>
<td></td>
<td>Passing</td>
</tr>
<tr>
<td>B</td>
<td>82 – 87%</td>
<td></td>
<td>Passing</td>
</tr>
<tr>
<td>B-</td>
<td>80 – 81%</td>
<td></td>
<td>Passing</td>
</tr>
<tr>
<td>C+</td>
<td>78 – 79%</td>
<td></td>
<td>Passing</td>
</tr>
<tr>
<td>C</td>
<td>72 – 77%</td>
<td></td>
<td>Passing</td>
</tr>
<tr>
<td>C-</td>
<td>70 – 71%</td>
<td></td>
<td>Passing*</td>
</tr>
<tr>
<td>D</td>
<td>60 – 69%</td>
<td></td>
<td>Passing*</td>
</tr>
<tr>
<td>F</td>
<td>0 – 59%</td>
<td></td>
<td>Failing</td>
</tr>
</tbody>
</table>

* Grades of "C-" and "D" are considered passing grades for undergraduate courses. However, a minimum grade of "C" is required in the BSAIT program for any course that is a prerequisite for one or more other courses. This course is a prerequisite for several courses in BSAIT Program – see http://www.gmu.edu/catalog/courses/it.html for more information on those courses.

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>Activity</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>25%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>35%</td>
</tr>
</tbody>
</table>

Notes:
- There are approximately 14 course content modules
- Late assignments are not accepted, for any reason
- Quizzes not taken as scheduled are scored at 0 points
- There are no extra credit opportunities
- Students are required to sit for the scheduled exams

The grading components are outlined in the following sections. Note that not all assignments are given an equal weight.

**Homework**
Homework will be assigned for each course module. To receive credit for any part of any homework question – all written work must be shown in detail. No credit will be awarded for answers (even if they are correct) that are not supported by written work.

No late assignments will be accepted. Students may submit incomplete assignments for partial credit.

**Quizzes**
Quizzes will be given (either written or via Blackboard) to test students’ mastery of the course material. Quizzes are closed notes, closed book: no external resources are permitted.

**Exams**
The final exam will be held during the scheduled final exam session (see http://registrar.gmu.edu/) and will be based on topics addressed throughout the entire course. The final exam will be “closed book” – no reference materials other than those provided with the exam paper will be permitted. Final exams will be retained by the Information Sciences and Technology 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 Outline

<table>
<thead>
<tr>
<th>Module</th>
<th>Class Content</th>
</tr>
</thead>
</table>
| 1      | Course introduction  
|        | Boolean Algebra  
|        | Logic/Digital Circuits |
| 2      | Truth Tables |
| 3      | Introduction to Programming and Python  
|        | Variables  
|        | Built-in Python Functions  
|        | Algorithms |
| 4      | Set Theory  
|        | Mathematical Functions |
| 5      | Selection: Boolean Expressions and if-elif-else statements in Python  
|        | Iteration: Python while loops  
|        | Algorithms |
| 6      | Counting Principles  
|        | Permutations  
|        | Combinations |
| 7      | Review and Midterm Exam |
| 8      | Probability |
| 9      | Conditional Probability and Bayes Theorem |
| 10     | Sequences, Sums  
|        | Iteration: Python for loops |
| 11     | Introduction to Trigonometry, Trig Graphs and Identities |
| 12     | Python Functions |
| 13     | Recurrence Relations, Recursion and Mathematical Induction |
| 14     | Review |

The information provided by the instructor corresponding to the material covered in each lecture should be completed prior to that lecture. Please note: the chapters are not covered in order and there is some material that will be provided by the instructor.

This schedule is subject to revision before and throughout the course. Registered students should see the Blackboard Learning System for the latest class schedule.

Important Dates

Dates for adding, dropping the course, etc. are available via: 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

Students are expected to attend each class (or if the class is online to participate as stipulated by the instructor), 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.

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

Departmental policy requires students to take exams at the scheduled time and place, unless there are truly compelling 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

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 asked to leave the course.

Discussion Board communication should be thoughtful and respectful.

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, homework and other assignments, and scores for homework and exams.
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.

Lecture slides are complements to the lecture process, not substitutes for it - access to lecture slides will be provided in Blackboard as a courtesy to students provided acceptable attendance is maintained.

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.

Assessable 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 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. Dean Griffiths has mandated a "zero tolerance" policy for plagiarism within The Volgenau School. The Instructor reserves the right to use manual and/or automated means (including 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.

For this course, the following requirements are specified:

- All assessable work is to be prepared by the individual student, unless the Instructor explicitly directs otherwise.
- 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.

Students may seek assistance with assigned work, (and are encouraged to do so) **provided**:

- The directions for the assigned work do not prohibit such assistance.
- Such assistance is acknowledged in the submitted work, clearly identifying the person(s) giving assistance and the nature of the assistance given.
- Any work to be submitted is prepared entirely and exclusively by the student submitting it. Students are expressly prohibited from sharing any assessable work for this course in any manner with other students (except students assigned as Teaching Assistants to this course and the student's section), unless all students involved have had their work graded and returned by the Instructor, or the Instructor has explicitly approved such sharing.

\(^1\) Available at [www.gmu.edu/catalog/apolicies](http://www.gmu.edu/catalog/apolicies) and related GMU Web pages.