



## Information Sciences and Technology Department

### Course Syllabus

# IT 102 Discrete Structures

*updated 05/19/2017*

#### 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

MATH 108 (or MATH 113) is a prerequisite or a co-requisite. Prerequisite enforced by registration system.

This requirement will be **strictly enforced**. Any student who does not meet the requirement will be dropped from the course at the start of the semester and the student will be responsible for academic or financial 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 BSIT 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 Outcome: 2*)

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

**Discrete Structures, 2<sup>nd</sup> Edition**

Author: Irene E. Bruno, PhD

Publisher: Pearson

ISBN: 978-1-323-75474-1

Availability: George Mason University Bookstore

**Faculty and Staff**

Instructor and Course Coordinator:

Irene Bruno  
Associate Professor IST Department  
Phone: 703-993-8541  
Email: [ibruno@gmu.edu](mailto:ibruno@gmu.edu)

Instructors

Hussna Azamy ([hazamy@gmu.edu](mailto:hazamy@gmu.edu))  
Johnnie Brown ([jbrown28@gmu.edu](mailto:jbrown28@gmu.edu))  
Joy Hughes ([jhughes@gmu.edu](mailto:jhughes@gmu.edu))  
Mounika Paliche ([mpaliche@gmu.edu](mailto:mpaliche@gmu.edu))

Administrative support:

[Fairfax campus](#)

**Engineering Building**

<http://eagle.gmu.edu/map/buildings/engineering.php> , Room 5400

Phone: 703-993-3565

[Science and Technology campus](#)

**Bull Run Hall**

[Bull Run Hall](#), Suite 102

Phone: 703-993-3565

## Grading

The grading scale for this course is:

99 – 100%	A+	Passing
92 – 98%	A	Passing
90 – 91%	A-	Passing
88 – 89%	B+	Passing
82 – 87%	B	Passing
80 – 81%	B-	Passing
78 – 79%	C+	Passing
72 – 77%	C	Passing
70 – 71%	C-	<i>Passing*</i>
60 – 69%	D	<i>Passing*</i>
0 – 59%	F	<b>Failing</b>

\* 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:

In-Seat Sections:

Activity	Distribution
Homework	10%
Quizzes	30%
Midterm Exam	30%
Final Exam	30%

Online Sections:

Activity	Distribution
Homework	20%
Discussion Board	20%
Midterm Exam	30%
Final Exam	30%

Notes:

- There are approximately 12 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. While in the spirit of collaboration, students are encouraged to work together on practice problems, homework should be completed without assistance. It is considered an Honor Code violation to post any homework problem or solution on any Internet site or to seek assistance with homework problems from anyone other than an IT102 GTA or an instructor. **No late** assignments will be accepted for any reason. Students may submit incomplete assignments for partial credit.

### **Quizzes (in-seat sections)**

Quizzes will be given to sections that regularly meet on campus to test students' mastery of the course material. Quizzes are closed notes, closed book: no external resources are permitted. There are no makeup opportunities for missed quizzes. Students are prohibited by the Honor Code to discuss the content of quizzes with any person other than their instructor or GTA.

### **Exams**

The midterm and final exam will be held as scheduled on the Blackboard site and will be based on topics addressed throughout the entire course. 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 (See Blackboard Site for Course Schedule and dates)**

<u>Chapter</u>	<u>Class Content</u>
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	Probability
8	Conditional Probability and Bayes Theorem
9	Sequences, Sums Iteration: Python for loops
10	Python Functions
11	Recurrence Relations, Recursion and Mathematical Induction
12	Introduction to Trigonometry, Trig Graphs and Identities
	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 may 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](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**

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 be 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 be 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.

On admission to Mason, students agree to comply with the requirements of the [GMU Honor System and Code](#). 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.

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. Submissions deemed by the instructor to be more than 50% identical to another student's submission will be submitted to the George Mason University Honor Committee.
- The individual student for this course must newly create all work 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.