COURSE SYLLABUS

1 ECE 1260 - Engineering Programming & Applications

2 Meeting Information

3 credits, 3 contact hours (Sec 001/002: Three 50-min. lect.; Sec 003: Two 75-min. lect.)

a. **Section 001:**
Lecture: MWF 9:35 am to 10:25 am Location: TBA, **Tol 316**

b. **Section 002:**
Lecture: MWF 10:40 am to 11:30 am Location: Vasey Hall 201A, **Vasey 201A**

c. **Section 003:**
Lecture: TR 10:00 am to 11:15 am Location: TBA, **Tol 310C**

3 Course Instructor(s), TA(s)

a. **Section 001:**

Class Instructor:	Dr. Sarvesh Kulkarni
Office Hours:	Mon, Wed 11:00 am - 12:30 pm, or by appt.
TA(s):	
Caroline Ross	cross9@villanova.edu
Office Hours:	Tue, Thu 10:00 am - 11:00 am, or by appt.
Room:	Tol 425

b. **Section 002:**

Class Instructor:	Dr. Sarada Prasad Gochhayat
Office Hours:	Tue, Thu, Fri 12:00 pm - 1:30 pm, or by appt.
TA(s):	
Caroline Ross	cross9@villanova.edu
Office Hours:	Tue, Thu 10:00 am - 11:00 am, or by appt.
Room:	Tol 425

c. **Section 003:**

Class Instructor:	Dr. Jiafeng Xie
Office Hours:	Wed 2:00 pm - 4:00 pm, or by appt.
TA(s):	
Pengzhou He	phe@villanova.edu
Office Hours:	Wed 1:00 pm - 3:00 pm, or by appt.
Room:	Tol 426A

4 Textbook

Delores M. Etter, *Engineering Problem Solving with C, Fourth Edition* , Prentice Hall, 2013. ISBN: 978-0136085317. REQUIRED.

a. **Other Supplemental Materials:** Slides and notes posted on Blackboard

5 Specific Course Information

a. **Catalog Description**
Introductory C programming - engineering-focused algorithms and program development in C using: elementary data structures, conditional branching, loop control, console and file I/O operations, pseudo-random numbers, functions, strings, arrays, matrices, structures and pointer variables.

b. **Prerequisites:** None; **Co-requisites:** ECE 1261

c. Required for BS CPE and BS EE

6 Learning Objectives

a. On conclusion of this course, students are expected to: 1. Understand the syntax, structure and construction of basic C programs, 2. Interpret problem statements to create a solution strategy (algorithm), 3. Translate algorithms to C program code using user-defined functions and functions from the C library, and ultimately to generate executable code, and 4. Realize that low-level hardware control can be effected using a high-level language (C).

b.

ABET Student Outcomes						
1	2	3	4	5	6	7
X						

The above student outcomes are defined by the Accreditation Board for Engineering and Technology (ABET) as:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

7 List of Covered Topics

1. Introduction to computers, their architecture, organization and programming
2. Algorithms, flowcharts, solutions approaches
3. C syntax and usage: constants, variables, basic data types (with range and precision)mathematical and logical operators, assignments, control and loop structures, standard input/output, strings, user-defined functions, library functions
4. Additional data types: arrays, structures, pointers
5. Dynamic memory allocation/de-allocation and access using pointers
6. Pseudo-random numbers, and their generation within a range
7. Data file operations
8. Recursion
9. C programming pitfalls

8 Tentative Schedule

Tentative schedules for all sections follow. Be sure to refer to the schedule for your specific section, if more than one is provided.

Tentative Schedule for **Section 001**

Week #	Dates	Topics of Study
1	1/18 - 1/20	Class introductions, syllabus and policies; introduction to computer architecture and organization; recent history of computers and languages - from Babbage to the present
2	1/23 - 1/27	Algorithms & solving methodology; C program structure; constants, variables - naming, memory storage, reserved words, basic data types, range and precision; the ASCII table; mathematical operators, their precedence & associativity
3	1/30 - 2/3	Assignments; typecasting; efficient computations (Horner's rule); I/O operations - scanf, printf, format specifiers Quiz 1 - Fri, 2/3
4	2/6 - 2/10	I/O redirection; math functions; conversion of math expressions to C statements; scientific examples: 1. CSI/forensics, 2. freezing temp. of seawater; character functions
5	2/13 - 2/17	Structures; system limitations; algorithm development - flowcharts, pseudocode; logical operators; control structures; Quiz 2 - Fri, 2/17
6	2/20 - 2/24	Loop structures, modular programming with functions - parameters, arguments, declarations (prototypes) and definitions; Example: tracking icebergs; random numbers
7	2/27 - 3/3	Psuedo-random number generation & use; catch-up & review; Midterm - Fri, 3/3
8	3/6 - 3/10	**Spring break**
9	3/13 - 3/17	Sq. roots using Newton's method; series expansion for e^X; Arrays - 1-D, 2-D; matrices
10	3/20 - 3/24	Strings and string functions, example usage; pointer variables - introduction, examples
11	3/27 - 3/31	Pointer representation of arrays; dynamic memory allocation/de-allocation; examples; Quiz 3 - Fri, 3/31
12	4/3 - 4/7	Catch-up; Solved examples **4/{6-10} Easter break**
13	4/10 - 4/14	Passing pointers and structures to/from functions; pass by reference & pass by value
14	4/17 - 4/21	File operations: reading, writing, error-handling, file pointers; recursion - factorials, Fibonacci sequence; Quiz 4 - Fri, 4/21
15	4/24 - 4/28	Overflows, underflows and general programming pitfalls.
16	5/1 - 5/3	Catch-up and review week
17	5/8 - 5/12	Final Exam - Sat 5/6 @ 10:45 am (only for Sec 001)

Tentative Schedule for **Section 002**

Week #	Dates	Topics of Study
1	1/18 - 1/20	Class introductions, syllabus and policies; introduction to computer architecture and organization; recent history of computers and languages - from Babbage to the present
2	1/23 - 1/27	Algorithms & solving methodology; C program structure; constants, variables - naming, memory storage, reserved words, basic data types, range and precision; the ASCII table; mathematical operators, their precedence & associativity
3	1/30 - 2/3	Assignments; typecasting; efficient computations (Horner's rule); I/O operations - scanf, printf, format specifiers Quiz 1 - Fri, 2/3
4	2/6 - 2/10	I/O redirection; math functions; conversion of math expressions to C statements; scientific examples: 1. CSI/forensics, 2. freezing temp. of seawater; character functions
5	2/13 - 2/17	Structures; system limitations; algorithm development - flowcharts, pseudocode; logical operators; control structures; Quiz 2 - Fri, 2/17
6	2/20 - 2/24	Loop structures, modular programming with functions - parameters, arguments, declarations (prototypes) and definitions; Example: tracking icebergs; random numbers
7	2/27 - 3/3	Psuedo-random number generation & use; catch-up & review; Midterm - Fri, 3/3
8	3/6 - 3/10	**Spring break**
9	3/13 - 3/17	Sq. roots using Newton's method; series expansion for e^X; Arrays - 1-D, 2-D; matrices
10	3/20 - 3/24	Strings and string functions, example usage; pointer variables - introduction, examples
11	3/27 - 3/31	Pointer representation of arrays; dynamic memory allocation/de-allocation; examples; Quiz 3 - Fri, 3/31
12	4/3 - 4/7	Catch-up; Solved examples **4/{6-10} Easter break**
13	4/10 - 4/14	Passing pointers and structures to/from functions; pass by reference & pass by value
14	4/17 - 4/21	File operations: reading, writing, error-handling, file pointers; recursion - factorials, Fibonacci sequence; Quiz 4 - Fri, 4/21
15	4/24 - 4/28	Overflows, underflows and general programming pitfalls.
16	5/1 - 5/3	Catch-up and review week
17	5/8 - 5/12	Final Exam - Tue 5/9 @ 2:30 pm (only for Sec 002)

Tentative Schedule for **Section 003**

Week #	Dates	Topics of Study
1	1/18 - 1/20	Class introductions, syllabus and policies; introduction to computer architecture and organization; recent history of computers and languages - from Babbage to the present; algorithms & solving methodology
2	1/23 - 1/27	C program structure; constants, variables - naming, memory storage, reserved words, basic data types, range and precision; the ASCII table; mathematical operators, their precedence & associativity; assignments; typecasting
3	1/30 - 2/3	Efficient computations (Horner's rule); I/O operations - scanf, printf, format specifiers Quiz 1 - Thu, 2/2
4	2/6 - 2/10	I/O redirection; math functions; conversion of math expressions to C statements; scientific examples: 1. CSI/forensics, 2. freezing temp. of seawater; character functions
5	2/13 - 2/17	Structures; system limitations; algorithm development - flowcharts, pseudocode; logical operators; control structures; Quiz 2 - Thu, 2/16
6	2/20 - 2/24	Loop structures, modular programming with functions - parameters, arguments, declarations (prototypes) and definitions; Example: tracking icebergs; random numbers
7	2/27 - 3/3	Psuedo-random number generation & use; catch-up & review; Midterm - Thu, 3/2
8	3/6 - 3/10	**Spring break**
9	3/13 - 3/17	Sq. roots using Newton's method; series expansion for e^X; Arrays - 1-D, 2-D; matrices
10	3/20 - 3/24	Strings and string functions, example usage; pointer variables - introduction, examples
11	3/27 - 3/31	Pointer representation of arrays; dynamic memory allocation/de-allocation; examples; Quiz 3 - Thu, 3/30
12	4/3 - 4/7	Catch-up; Solved examples **4/{6-10} Easter break**
13	4/10 - 4/14	Passing pointers and structures to/from functions; pass by reference & pass by value
14	4/17 - 4/21	File operations: reading, writing, error-handling, file pointers; recursion - factorials, Fibonacci sequence; Quiz 4 - Thu, 4/20
15	4/24 - 4/28	Overflows, underflows and general programming pitfalls.
16	5/1 - 5/3	Catch-up and review week
17	5/8 - 5/12	Final Exam - Mon 5/8 @ 8:30 am (only for Sec 003)

9 Grading Policy

Homework: 20% weightage
Quizzes: four quizzes, 20% total weightage
Midterm examination: 30% weightage
Final Exam: 30% weightage

The final grading curve uses composite scores and will reflect a class average of B, depending on the overall performance of the class. Regardless of the grading curve, a student with a composite score of 90+ will be awarded an A grade while a student with a composite score of less than 50 will be awarded an F grade.

10 HW Assignment and Laboratory Report Submission Policy

HW must be completed and uploaded to "Blackboard" (the course management software) before the posted deadline. For HW assignments that do not require programming, you may handwrite your solutions and either hand them in, or upload a single scanned pdf file before the posted deadline. If programming assignments are given, you must zip up the source code directory and upload the zipped file to "Blackboard". Late HW assignments will be assessed a 10% penalty per day, up to the posted cut-off date. After the cut-off date, HW assignments WILL NOT be accepted. If you cannot fully finish your HW, turn in your incomplete work to receive partial credit.

11 Attendance Policy

The full version of the official Villanova class attendance policy is posted at https://live-villanova-catalog.cleancatalog.io/class-attendance, but the main points are as follows.

Class and laboratory attendance for first-year students is mandatory. A first-year student will receive a grade of "Y" (fail) if the number of unexcused absences in a course exceeds twice the number of weekly class meetings for that course.

Whenever possible, students should inform the instructor if they plan to be late or absent from class. In all cases, documentation is required to petition for *excused* absences to the Associate Dean for Student and Strategic Programs, Dr. Stephen Jones. The excused absence form is posted at: https://forms.office.com/r/H2kbHKLUmw.

Excused absences do not count towards a failure in the course for first year students. Absence from class does not release the student from assigned work. Students who miss an in-class obligation such as an exam, a presentation, etc., due to an excused absence will not be penalized - the instructor may offer a make-up test, arrange an alternative time for a presentation, exempt a student from the assignment, or provide another arrangement. In the case of illness or injury, the form must be submitted within 24 hours of missing a class. The University's list of excused absences for all students includes the following:

1. Participation in NCAA athletic competitions
2. Participation in special academic events such as: conferences, field trips, project competitions, etc., and in official university business such as student representatives attending meetings related to university governance
3. Attendance at significant events of the immediate family such as: funerals, weddings, etc.
4. Religious holidays - see the University's policy on Religious Holidays
5. College-approved participation in placement activities such as: job interviews, graduate school interviews, job fairs

6. Legally required absence such as: jury duty, court appearance, short-term military service
7. Documented serious illness or disability

12 Examination Policy

The College of Engineering has adopted the following general examination guidelines:

1. Students must arrive before the start of the examination. Under exceptional circumstances a student may need to arrive late, but he/she can enter the examination room no later than five (5) minutes after the start of the exam.
2. Cell phones must be turned off until the student exits the examination room.
3. The official Villanova class attendance policy must be followed when requesting excuses for absences or lateness to an examination.
4. Each student must write and sign the following statement, "I have neither given nor received any unauthorized assistance in the completion of this examination."
5. For online examinations, the instructor may implement video proctoring or other measures to ensure academic integrity. For consent purposes, the instructor will inform students in advance if (s)he plans to use any form of video-proctoring and whether the examination will be recorded.

13 Academic Integrity Policy

The College of Engineering is committed to creating an environment of academic integrity and ethical decision-making that we hope is reflected in the actions of our students and graduates. As Villanova students, integrity is central to the University mission. As engineers, our code of conduct requires us to place honor and integrity at the forefront of everything we do. As engineering students, it is expected that you will begin to adopt these values and instill them into your work habits. Students violating the academic integrity policy will receive a zero on that assignment or exam and the violation will be reported to the Associate Dean for Academic Affairs. The University's academic integrity policy can be found on the following web page:
https://live-villanova-catalog.cleancatalog.io/academic-integrity-0.

14 Adherence to the Student Code of Conduct

Students are expected to act in a professional and respectful manner to their fellow students, faculty, and staff. Students should become acquainted with and understand the responsibilities set forth in the Student Handbook, especially those in the sections on Policy and Regulations. Adherence to university regulations is expected and required for successful completion of the program of studies. Enforcement within the classroom of policies regarding classroom behavior is the responsibility of the faculty member. All other discipline problems are to be referred to the Dean of Students.

15 Inclusive Classroom

This classroom is a place where you will be treated with respect; we welcome individuals of all ages, backgrounds, beliefs, ethnicities, gender, gender identities and expressions, sexual orientation, and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment to allow all among us to learn and flourish.

16 Students with Disabilities

It is the policy of the university to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability (non-physical) please register with the office of Learning Support Services (LSS) by emailing Learning.support.services@villanova.edu or by phoning 610-519-5176 as soon as possible. Registration is *required* in order to receive accommodations. In addition, please contact the instructor during office hours in order to make the appropriate arrangements.

The Office of Disability Services (ODS) collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact and register with Gregory Hannah, advisor to students with disabilities at 610-519-3209 or visit the office on the second floor of the Connelly Center.

17 Tutoring Services

Villanova's tutoring services include The Writing Center, The Learner's Studio, and The Center for Speaking and Presentation. These services are offered free of charge to students. Drop in as-needed or book a regular weekly session to supercharge your academic success. Sessions can be 30 or 60 minutes in length.

Register for an account and book sessions in advance at villanova.mywconline.com. If you don't see your class listed, request a tutor for a missing subject at: tutorrequest.villanova.edu For more information, contact Juliana Struder at juliana.studer@villanova.edu or at 610-519-5862.

18 Online Expectations

Some or all sessions of this class may be recorded for educational purposes and for later playback. In order to foster a professional environment, please wear appropriate clothes, refrain from eating, mute your microphone if you are not talking to eliminate background noise and select an appropriate setting free of distractions. You may turn off your webcam for privacy reasons unless explicitly instructed not to do so by the instructor (such as during the conduct of online examinations).

19 Electronics Policy

The use of electronic devices, such as phones, laptops, tablets, calculators, etc., during class is generally allowed, unless their use causes a disturbance to others. During examinations, the use of any electronic device is prohibited, unless it is expressly authorized by the instructor.

Students are prohibited from making any audio or visual recordings (including taking photographs) of lectures, discussions, or other classroom activities, unless a student (1) has written permission in advance from the instructor, or (2) is permitted to record under terms and conditions as approved by the University's Office of Disability Services or Learning Support Services. Students who have received approval to record classes as an academic accommodation must provide supporting documentation from the Office of Disability Services or Learning Support Services in advance of any recording. Students may use authorized recordings only for the purposes of individual study in the course, and may not disseminate or share them with a wider audience without explicit permission.

20 Copyright Policy

The materials used in Villanova University courses ("Course Materials") generally represent the intellectual property of course instructors, third parties and/or the university which may not be disseminated or reproduced in any form for public distribution (e.g., sale, exchange, etc.) without the written permission of the course instructor. Course materials include all written or electronic documents and materials, including syllabi, current and past examination questions/answers, and presentations such as lectures, videos, slides, etc., provided by a course instructor. Course materials may only be used by students enrolled in the course for academic (course-related) purposes.

Published course readings (book chapters, articles, reports, etc.) available in "Blackboard" are copyrighted materials. These works are made available to students through licensed databases or fair use. They are protected by copyright law, and may not be further disseminated or reproduced in any form for distribution (e.g. uploading to websites, sale, exchange, etc.) without the permission of the copyright owner.

Follow these links for more information on Intellectual Property, Copyright, and Computer Acceptable Use.

21 Professorial Duties

It is important to note that teaching is one of the many duties that professors perform as part of their job responsibilities. In addition to teaching, professors perform research, advise graduate students, edit journals and review journal articles, serve on committees for the university and professional societies, travel to conferences to remain abreast of current developments and to present their results... to name just a few commitments.