



# G. PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY

Pasupula, Nandikotkur Road, Kurnool-518014

## BRANCH: COMPUTER SCIENCE AND ENGINEERING

### COURSE DESCRIPTION FORM

Course Title	COMPUTER PROGRAMMING			
Course Code	15A05101			
Regulation	R15 – JNTUA			
Course Structure	Lectures	Tutorials	Practicals	Credits
	3	1	-	3
Course Coordinator	P Kiran Rao			
Team of Instructors	P Kiran Rao, R Anil Kumar, Ramarao, Varaprasad			

#### I. COURSE OVERVIEW:

The course covers the basics of programming and demonstrates fundamental programming techniques, customs and terms including the most common library functions and the usage of the preprocessor. This course helps the students in gaining the knowledge to write simple C language applications, mathematical and engineering problems. This course helps to undertake future courses that assume this programming language as a background in computer programming. Topics include variables, data types, functions, control structures, pointers, strings, arrays and dynamic allocation principles. This course is reached to student by power point presentations, lecture notes, and lab involve the problem solving in mathematical and engineering areas.

#### II. PREREQUISITE(S):

Level	Credits	Periods/ Week	Prerequisites
UG	3	3	Mathematical background and Logical skills

### III. MARKS DISTRIBUTION:

Sessional Marks End Exam	University Marks	Total
<p style="text-align: center;"><b>Midterm tests</b></p> <p>There shall be three midterm examinations. Each midterm examination consists of descriptive paper and objective paper. Each descriptive paper is for 30 marks with 90 minutes duration and shall contain 5 questions. The student has to answer 3 questions, each carrying 10 marks. Each objective paper is for 10 marks                      First midterm examination shall be conducted for the first, second and half of third unit of syllabus. Second midterm examination shall be conducted in second half of third unit and fourth and fifth units.                      Internal marks shall be awarded considering the 20% marks of worst mid marks and 80% marks of the best mid marks. This comes to a maximum of 30 marks.</p>	<b>70</b>	<b>100</b>

### IV. EVALUATION SCHEME:

S. No	Component	Duration	Marks		
			Marks in mid exams	Total marks in mid	University Marks
1.	I Mid Examination	110 minutes	30	30	
3.	II Mid Examination	110 minutes	30		
5.	External Examination	3 hours			70
6.	TOTAL MARKS				100

### V. COURSE OBJECTIVES:

**At the end of the course, the students will be able to:**

1. Be familiar with the fundamental knowledge of computer systems and computing environment.
2. Understand the basic terminology in computer programming and its role in problem solving.
3. Able to write, compile and debug programs in C language.
4. Be familiar with the usage of conditional and iterative control structures for developing optimal solutions.
5. Apply the techniques of structured (functional) decomposition and describe the mechanics of parameter passing.
6. Be familiar with the pointer mechanism and file concepts.

## VI. COURSE OUTCOMES:

After completing this course the student must demonstrate the knowledge and ability to:

1. Comprehend the fundamental concepts of computer hardware and problem solving abilities.
2. Knowledge on the basic concepts of algorithms, flow charts and C programming.
3. Ability to analyze the procedure for providing input and acquire output from the program along with implementation of control statements.
4. Interpret the importance of pointers and functions in programming.
5. Analyze and Modularize the problem and its solution by using functions, structures and unions.
6. Ability to relate the concepts of strings, files and preprocessors to the real world applications.

## VII. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes		Level	Proficiency assessed by
PO1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	H	Assignments, Tutorials
PO2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	H	Assignments
PO3	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	H	Assignments
PO4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	S	Assignments
PO5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	H	Assignments
PO6	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.	N	--
PO7	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	N	--
PO8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	N	--

PO9	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	N	--
PO10	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	S	Assignments
PO11	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	N	--
PO12	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	S	Assignments

**N - None**

**S - Supportive**

**H - Highly Related**

## VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes		Level	Proficiency assessed by
PSO1	Possessing algorithmic Knowledge to give solutions for complex computational problems with problem analytical skills, to derive conclusions using mobile and web applications and to design keys for societal as well as environmental problems.	S	Labs & Assignments
PSO2	Mastering modern software tools to conduct investigations of complex problems, in turn gaining contextual knowledge to access societal issues and to deliver professionalism for better social service	S	Labs, Workshops, Project Work
PSO3	Adhering to professional ethics, function effectively as an individual and as a member or leader in diverse software and hardware teams and in multidisciplinary settings by demonstrating contextual knowledge for substantial development of software applications	S	Seminars and Workshops
PSO4	Communicate effectively on complex software development activities, manage software in multidisciplinary environments and to engage in independent and life long learning in the broadest context of technical change	S	Seminars and Workshops

N - None

S - Supportive

H - Highly Related

## IX. SYLLABUS:

### UNIT- I

**Overview of Computers and Programming :** Electronic Computers Then and Now Computer Hardware , Computer Software, Algorithm , Flowcharts, Software Development Method ,Applying the Software Development Method.

**Types, Operators and Expressions:** Variable Names, Data Types and Sizes, Constants, Declarations, Relational and Logical Operators , Type Conversions ,Increment and Decrement Operators , Bitwise Operators , Assignment Operators and Expressions, Conditional Expressions , Precedence and Order of Evaluation.

### UNIT - II

Selections Statements – Iteration Statements – Jump Statements- Expression Statements – Block Statements. Single Dimensional Arrays – Generating a Pointer to an Array – Passing Single Dimension Arrays to Functions – Strings – Two Dimensional Arrays – Indexing Pointers – Array Initialization – Variable Length Arrays

### UNIT - III

Pointer Variables – Pointer Operators - Pointer Expressions – Pointers And Arrays – Multiple Indirection – Initializing Pointers – Pointers to Functions – C’s Dynamic Allocation Functions –Problems with Pointers. Understanding the scope of Functions – Scope Rules – Type Qualifiers – Storage Class Specifiers- Functions Arguments –The Return Statement.

### UNIT - IV

Command line arguments – Recursion – Function Prototypes – Declaring Variable Length Parameter Lists Structures – Arrays of Structures – Passing Structures to Functions – Structure Pointers – Arrays and Structures within Structures – Unions – Bit Fields – Enumerations – typedef

## UNIT - V

Reading and Writing Characters – Reading and Writing Strings – Formatted Console I/O – Printf - Scanf – Standard C Vs Unix File I/O – Streams and Files – File System Basics – Fread and Fwrite – Fseek and Random Access I/O – Fprintf ( ) and Fscanf( ) – The Standard Streams – The Preprocessor Directives #define and #include.

Text Books:

1. “The Complete Reference C”- Fourth Edition- Herbert Schildt- McGrawHill Education.
2. “The C Programming Language” Second Edition- Brian W. Kernighan- Dennis M. Ritchie- Prentice Hall-India. (UNIT- I)

References:

1. Programming in C, Second Edition – Pradip Dey, Manas Ghosh, Oxford University Press.
2. “C From Theory to Practice”- George S. Tselikis- Nikolaos D. Tselikas- CRC Press.
3. “Programming with C”- R S Bichkar- University Press.
4. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education. (UNIT-I)
5. Computer Fundamentals and C Programming- Second Edition- P.Chenna Reddy

## X. COURSE PLAN:

Lecture No.	Learning Objectives	Topics to be covered	Reference
1.	<b>Understanding</b> the evolution of computers	<b>Overview of Computers and Programming</b> : Electronic Computers Then and Now	T2
2.	<b>Identify</b> basic parts of computers.	Computer Hardware , Computer Software	T2
3.	<b>Understand</b> the basics of a C programming.	Algorithm , Flowcharts	T2
4.	Understand the software development process	Software Development Method ,Applying the Software Development Method	T2
5.	<b>Understand</b> the basic building blocks of a C program	<b>Types, Operators and Expressions:</b> Variable Names, Data Types and Sizes, Constants	T2
6.	<b>Understand</b> the basic building blocks of a C program	Declarations	T2
7-10	<b>Understand</b> the basic building blocks of a C program	Relational and Logical Operators , Type Conversions ,Increment and Decrement Operators , Bitwise Operators , Assignment Operators and Expressions	T2
11	<b>Understand</b> the rules of precedence and associativity in evaluating expressions.	Conditional Expressions , Precedence and Order of Evaluation	T2
12-13	<b>Write</b> programs using two-way and multi-way selection.	Selections Statements	T1-3.1
14-15	<b>Identify</b> appropriate loop construct for a given problem	Iteration Statements	T1-3.2
16	<b>Identify</b> appropriate loop construct for a given problem	Jump Statements, Expression Statements, Block Statements	T1-3.3
17	<b>Understand</b> the usage of arrays to store homogenous data.	Single Dimensional Arrays	T1-4.1
18	<b>Understand</b> the applications of arrays	Generating a Pointer to an Array	T1-4.2
19	<b>Write</b> programs to manipulate strings.	Strings	T1-4.4
20	<b>Understand</b> the applications of arrays	Two Dimensional Arrays	T1-4.5
21	<b>Write</b> effective programs using pointers	Indexing Pointers – Array Initialization –	T1-4.7

		Variable Length Arrays	
22	<b>Understand</b> the basic concepts of pointers.	Pointer Variables	T1-5.2
23	<b>Understand</b> the basic concepts of pointers.	Pointer Operators	T1-5.3
24	<b>Understand</b> the basic concepts of pointers.	Pointer Expressions	T1-5.4
25	<b>Write</b> effective programs using pointers for dynamic memory allocation.	Pointers And Arrays	T1-5.5
26	<b>Understand</b> the basic concepts of pointers	Multiple Indirection, Initializing Pointers	T1-5.6 TO 5.7
27	<b>Understand</b> the basic concepts of pointers	Pointers to Functions, Problems with Pointers	T1-5.8
28-29	<b>Understand</b> the memory management.	Dynamic Allocation Functions	T1-5.9
30	<b>Differentiate</b> local and global scope of variables.	Understanding the scope of Functions	T1-6.1
31	<b>Differentiate</b> local and global scope of variables.	Scope Rules, Type Qualifiers, Storage Class Specifier	T1-6.2
32-33	<b>Design</b> and <b>implement</b> multi-function programs.	Functions Arguments, The Return Statement	T1-6.3
34	<b>Understand</b> data passing method to main function	Command line arguments	T1-6.4
35-36	<b>Implement</b> recursive solutions to problems.	Recursion	T1-6.7
37-38	<b>Design</b> and <b>implement</b> multi-function programs	Function Prototypes	T1-6.8
39	<b>Design</b> and <b>implement</b> multi-function programs	Declaring Variable Length Parameter Lists	T1-6.9
40-42	<b>Understand</b> the usage and applications of structures to store heterogeneous data	Structures	T1-7.1
43	<b>Understand</b> the usage and applications of structures to store heterogeneous data	Arrays of Structures	T1-7.2
44	<b>Understand</b> the usage and applications of structures to store heterogeneous data	Passing Structures to Functions	T1-7.3
46	<b>Understand</b> the usage and applications of structures to store heterogeneous data	Structure Pointers	T1-7.4
47-50	<b>Understand</b> the usage and applications of structures to store heterogeneous data	Arrays and Structures within Structures	T1-7.5



51	<b>Differentiate</b> structures and unions in terms of memory allocation.	Unions ,Bit Fields	T1-7.6
52	<b>Understand</b> the enumerated data types.	Enumerations, typedef	T1-7.7
53	<b>Understand</b> how to read characters	Reading and Writing Characters	T1-8.1
54	<b>Understand</b> how to read strings	Reading and Writing Strings	T1-8.2
55	<b>Understand</b> how to read and display the strings	Formatted Console I/O – Printf , Scanf	T1-8.3
56	<b>Understand</b> the difference between c Vs Unix I/o	Standard C Vs Unix File I/O,	T1-9.2
57-58	<b>Use</b> files to store the data	Streams and Files	T1-9.3
59-60	<b>Use</b> function to read and write the bunch of data	File System Basics – Fread and Fwrite – Fseek	T1-9.4
61	<b>Understand</b> the data reading randomly in a file	Random Access I/O – Fprintf ( ) and Fscanf( )	T1-9.6
62	<b>Understand</b> the different types of streams	The Standard Streams	T1-9.8
63-64	<b>Understand</b> the pre-processor directives usage	The Preprocessor Directives #define and #include	T1-10.2

**XII. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF  
PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:**

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
1	H	H	S	H									H	S		
2	H	H	H	S									S	S		
3	S	S	S										S	S	H	
4	S	S	H	H										S		S
5	S	H	H	H									S	H		
6	S	S	H	S									S			

**S – Supportive**

**H - Highly Related**

**Prepared by :**

**Date :**

**HOD CSE**