**ANNA UNIVERSITY, CHENNAI**

**AFFILIATED INSTITUTIONS**

**B.TECH INFORMATION TECHNOLOGY**

**REGULATIONS – 2017**

**CHOICE BASED CREDIT SYSTEM**

**PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

1. To ensure graduates will be proficient in utilizing the fundamental knowledge of basic sciences, mathematics and Information Technology for the applications relevant to various streams of Engineering and Technology.
2. To enrich graduates with the core competencies necessary for applying knowledge of computers and telecommunications equipment to store, retrieve, transmit, manipulate and analyze data in the context of business enterprise.
3. To enable graduates to think logically, pursue lifelong learning and will have the capacity to understand technical issues related to computing systems and to design optimal solutions.
4. To enable graduates to develop hardware and software systems by understanding the importance of social, business and environmental needs in the human context.
5. To enable graduates to gain employment in organizations and establish themselves as professionals by applying their technical skills to solve real world problems and meet the diversified needs of industry, academia and research.

**PROGRAM OUTCOMES (POs)**

**ENGINEERING GRADUATES WILL BE ABLE TO:**

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complexengineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems anddesign 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.
4. **Conduct investigations of complex problems**: Use research-based knowledge andresearch methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modernengineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

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1. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assesssocietal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
2. **Environment and sustainability**: Understand the impact of the professional engineeringsolutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
3. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities andnorms of the engineering practice.
4. **Individual and team work**: Function effectively as an individual, and as a member or leader indiverse teams, and in multidisciplinary settings.
5. **Communication**: Communicate effectively on complex engineering activities with theengineering 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.
6. **Project management and finance**: Demonstrate knowledge and understanding of theengineering 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.
7. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage inindependent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OBJECTIVES (PSOs)**

1. To create, select, and apply appropriate techniques, resources, modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
2. To manage complex IT projects with consideration of the human, financial, ethical and environmental factors and an understanding of risk management processes, and operational and policy implications.

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**MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES**

A broad relation between the programme objective and the outcomes is given in the following table

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PROGRAMME EDUCATIONAL OBJECTIVES** |  |  | **PROGRAMME OUTCOMES** | | | | | | | |  |  |
|  | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** | **K** | **L** |
| 1 | 3 | 2 |  |  |  |  |  |  |  |  |  |  |
| 2 | 3 | 3 | 1 | 1 |  |  |  |  |  |  |  | 2 |
| 3 |  |  | 3 |  |  | 1 |  |  |  |  |  | 3 |
| 4 |  |  | 3 |  | 1 | 2 | 3 | 1 |  |  |  |  |
| 5 |  |  |  | 3 |  |  |  | 1 | 1 | 2 | 2 | 1 |

**MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES**

A broad relation between the Program Specific Objectives and the outcomes is given in the following table

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **PROGRAM** |  |  |  |  |  | **PROGRAMME OUTCOMES** | | | | | | |  |  |  |  |  |
| **SPECIFIC** | **A** | **B** |  | **C** | **D** |  | **E** |  | **F** | **G** |  | **H** |  | **I** | **J** | **K** | **L** |
| **OBJECTIVES** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | 3 | 2 |  |  |  |  |  | 3 |  |  |  |  |  | 2 | 2 |  |  |
| 2 |  |  |  |  | 3 |  |  |  |  |  | 3 |  | 3 |  |  | **3** |  |
| Contribution | |  | 1: Reasonable | | |  |  | 2:Significant | | |  |  | 3:Strong | |  |  |  |

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**REGULATIONS – 2017**

**CHOICE BASED CREDIT SYSTEM**

**CURRICULA AND SYLLABI**

**SEMESTER I**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SI.** | **COURSE** | **COURSE TITLE** | **CATEGORY** | **CONTACT** | **L** | **T** | **P** | **C** |  |
| **No** | **CODE** | **PERIODS** |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| **THEORY** | |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| 1. | HS8151 | [Communicative English](#page5) | HS | 4 | 4 | 0 | 0 | 4 |  |
|  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| 2. | MA8151 | Engineering | BS | 4 | 4 | 0 | 0 | 4 |  |
|  |  | Mathematics - I |  |
|  |  |  |  |  |  |  |  |  |
| 3. | PH8151 | Engineering Physics | BS | 3 | 3 | 0 | 0 | 3 |  |
|  |  |  |  |  |  |  |  |  |  |
| 4. | CY8151 | Engineering Chemistry | BS | 3 | 3 | 0 | 0 | 3 |  |
|  |  |  |  |  |  |  |  |  |  |
| 5. | GE8151 | Problem Solving and Python | ES | 3 | 3 | 0 | 0 | 3 |  |
|  |  | Programming |  |
|  |  |  |  |  |  |  |  |  |
| 6. | GE8152 | Engineering Graphics | ES | 6 | 2 | 0 | 4 | 4 |  |
|  |  |  |  |  |  |  |  |  |  |
| **PRACTICALS** | |  |  |  |  |  |  |  |  |
| 7. | GE8161 | [Problem Solving and Python](#page14) | ES | 4 | 0 | 0 | 4 | 2 |  |
|  |  | [Programming](#page14) Laboratory |  |  |  |
|  |  |  |  |  |  |  |  |  |
| 8. | BS8161 | [Physics and Chemistry](#page15) | BS | 4 | 0 | 0 | 4 | 2 |  |
|  |  | [Laboratory](#page15) |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  | **TOTAL** | **31** | **19** | **0** | **12** | **25** |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  | **SEMESTER II** | |  |  |  |  |  |  |
| **SI.** | **COURSE** | **COURSE TITLE** | **CATEGORY** | **CONTACT** | **L** | **T** | **P** | **C** |  |
| **No** | **CODE** | **PERIODS** |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| **THEORY** | |  |  |  |  |  |  |  |  |
| 1. | HS8251 | [Technical English](#page16) | HS | 4 | 4 | 0 | 0 | 4 |  |
| 2. | MA8251 | Engineering Mathematics - II | BS | 4 | 4 | 0 | 0 | 4 |  |
| 3. | PH8252 | Physics for Information Science | BS | 3 | 3 | 0 | 0 | 3 |  |
| 4. | BE8255 | Basic Electrical, Electronics | ES | 3 | 3 | 0 | 0 | 3 |  |
|  |  | and Measurement Engineering |  |  |  |
|  |  |  |  |  |  |  |  |  |
| 5. | IT8201 | [Information Technology](#page20) | PC | 3 | 3 | 0 | 0 | 3 |  |
|  |  | [Essentials](#page20) |  |  |  |
|  |  |  |  |  |  |  |  |  |
| 6. | CS8251 | [Programming in C](#page22) | PC | 3 | 3 | 0 | 0 | 3 |  |
| **PRACTICALS** | |  |  |  |  |  |  |  |  |
| 7. | GE8261 | Engineering Practices | ES | 4 | 0 | 0 | 4 | 2 |  |
|  |  | Laboratory |  |  |  |
|  |  |  |  |  |  |  |  |  |
| 8. | CS8261 | C [Programming Laboratory](#page26) | PC | 4 | 0 | 0 | 4 | 2 |  |
| 9. | IT8211 | [Information Technology](#page27) | ES | 2 | 0 | 0 | 2 | 1 |  |
|  |  | [Essentials Laboratory](#page27) |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  | **TOTAL** | **30** | **20** | **0** | **10** | **25** |  |

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**GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING**  **L T P C 3 0 0 3**

**OBJECTIVES:**

* To know the basics of algorithmic problem solving
* To read and write simple Python programs.
* To develop Python programs with conditionals and loops.
* To define Python functions and call them.
* To use Python data structures –- lists, tuples, dictionaries.
* To do input/output with files in Python.

**UNIT I** **ALGORITHMIC PROBLEM SOLVING** **9**

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

**UNIT II** **DATA, EXPRESSIONS, STATEMENTS** **9**

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

**UNIT III** **CONTROL FLOW, FUNCTIONS** **9**

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional

(if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

**UNIT IV** **LISTS, TUPLES, DICTIONARIES** **9**

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters;

Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

**UNIT V** **FILES, MODULES, PACKAGES** **9**

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

**OUTCOMES:**

**Upon completion of the course, students will be able to**

* Develop algorithmic solutions to simple computational problems
* Read, write, execute by hand simple Python programs.
* Structure simple Python programs for solving problems.
* Decompose a Python program into functions.
* Represent compound data using Python lists, tuples, dictionaries.
* Read and write data from/to files in Python Programs.

**TOTAL : 45 PERIODS**

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**TEXT BOOKS:**

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist’’, 2nd edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016 [(http://greenteapress.com/wp/think-python/)](http://greenteapress.com/wp/think-python/)
2. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

**REFERENCES:**

1. John V Guttag, ―Introduction to Computation and Programming Using Python’’, Revised and expanded Edition, MIT Press , 2013
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python:

An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

1. Timothy A. Budd, ―Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.,, 2015.
2. Kenneth A. Lambert, ―Fundamentals of Python: First Programs‖, CENGAGE Learning, 2012.
3. Charles Dierbach, ―Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
4. Paul Gries, Jennifer Campbell and Jason Montojo, ―Practical Programming: An Introduction to Computer Science using Python 3‖, Second edition, Pragmatic Programmers, LLC, 2013.

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| --- | --- | --- |
| **GE8161** | **PROBLEM SOLVING AND PHYTHON PROGRAMMING** | **L T P C** |
|  | **LABORATORY** | **0 0 4 2** |

**OBJECTIVES**

* To write, test, and debug simple Python programs.
* To implement Python programs with conditionals and loops.
* Use functions for structuring Python programs.
* Represent compound data using Python lists, tuples, dictionaries.
* Read and write data from/to files in Python.

**LIST OF PROGRAMS**

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton’s method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Simulate elliptical orbits in Pygame
13. Simulate bouncing ball using Pygame

**PLATFORM NEEDED**

Python 3 interpreter for Windows/Linux

**OUTCOMES**

Upon completion of the course, students will be able to

* Write, test, and debug simple Python programs.
* Implement Python programs with conditionals and loops.
* Develop Python programs step-wise by defining functions and calling them.
* Use Python lists, tuples, dictionaries for representing compound data.
* Read and write data from/to files in Python.

**TOTAL :60 PERIODS**

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