

**ANNA UNIVERSITY, CHENNAI**  
**AFFILIATED INSTITUTIONS**  
**B.E. COMPUTER SCIENCE AND ENGINEERING**  
**REGULATIONS - 2017**  
**CHOICE BASED CREDIT SYSTEM**

**PROGRAM EDUCATIONAL OBJECTIVES (PEOs):**

1. To enable graduates to pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs. To ensure that graduates will have the ability and attitude to adapt to emerging technological changes.

**PROGRAM OUTCOMES POs:**

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering 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 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.
4. Conduct investigations of complex problems: 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.
5. Modern tool usage: 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.
6. The engineer and society: 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.
7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communication: 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.

11. Project management and finance: 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.
12. Life-long learning: 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.

**PROGRAM SPECIFIC OBJECTIVES (PSOs)**

To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering.

To apply software engineering principles and practices for developing quality software for scientific and business applications.

To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems.

**Mapping of POs/PSOs to PEOs**

**Contribution**

**1: Reasonable**

**2: Significant**

**3: Strong**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (Regulation 2017)**

**COURSE OUTCOMES**

|              |  | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|--------------|--|----------|----------|----------|----------|
| <b>R2017</b> | <b>HS8151 COMMUNICATIVE ENGLISH</b>  | <b>4</b> | <b>0</b> | <b>0</b> | <b>4</b> |
| <b>CO 1</b>  | Read articles of a general kind in magazines and newspapers.   |          |          |          |          |
| <b>CO 2</b>  | Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English                                    |          |          |          |          |
| <b>CO 3</b>  | Comprehend conversations and short talks delivered in English  |          |          |          |          |
| <b>CO 4</b>  | Write short essays of a general kind and personal letters and emails in English.   |          |          |          |          |
| <b>R2017</b> | <b>MA8151 ENGINEERING MATHEMATICS – I</b>  | <b>4</b> | <b>0</b> | <b>0</b> | <b>4</b> |
| <b>CO 1</b>  | Use both the limit definition and rules of differentiation to differentiate functions.   |          |          |          |          |
| <b>CO 2</b>  | Apply differentiation to solve maxima and minima problems.   |          |          |          |          |
| <b>CO 3</b>  | Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.  |          |          |          |          |
| <b>CO 4</b>  | Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.       |          |          |          |          |
| <b>CO 5</b>  | Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.  |          |          |          |          |
| <b>CO 6</b>  | Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.   |          |          |          |          |
| <b>CO 7</b>  | Apply various techniques in solving differential equations.  |          |          |          |          |
| <b>R2017</b> | <b>PH8151 ENGINEERING PHYSICS</b>  | <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |
| <b>CO 1</b>  | The students will gain knowledge on the basics of properties of matter and its applications  |          |          |          |          |
| <b>CO 2</b>  | The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,                                     |          |          |          |          |
| <b>CO 3</b>  | The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, |          |          |          |          |
| <b>CO 4</b>  | The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes                                 |          |          |          |          |
| <b>CO 5</b>  | The students will understand the basics of crystals, their structures and different crystal growth techniques.   |          |          |          |          |

|              |  |          |          |          |          |
|--------------|--|----------|----------|----------|----------|
| <b>R2017</b> | <b>CY8151 ENGINEERING CHEMISTRY</b>  | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|              |  | <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |
| <b>CO 1</b>  | The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning. |          |          |          |          |
| <b>R2017</b> | <b>GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING</b>   | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|              |  | <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |
| <b>CO 1</b>  | Develop algorithmic solutions to simple computational problems   |          |          |          |          |
| <b>CO 2</b>  | Read, write, execute by hand simple Python programs.   |          |          |          |          |
| <b>CO 3</b>  | Read, write, execute by hand simple Python programs.   |          |          |          |          |
| <b>CO 4</b>  | Structure simple Python programs for solving problems.   |          |          |          |          |
| <b>CO 5</b>  | Decompose a Python program into functions  |          |          |          |          |
| <b>CO6</b>   | Represent compound data using Python lists, tuples, dictionaries   |          |          |          |          |
| <b>CO7</b>   | Read and write data from/to files in Python Programs.  |          |          |          |          |
| <b>R2017</b> | <b>MA8351 DISCRETE MATHEMATICS</b>   | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|              |  | <b>4</b> | <b>0</b> | <b>0</b> | <b>4</b> |
| <b>CO 1</b>  | Have knowledge of the concepts needed to test the logic of a program.  |          |          |          |          |
| <b>CO 2</b>  | Have an understanding in identifying structures on many levels.  |          |          |          |          |
| <b>CO 3</b>  | Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.   |          |          |          |          |
| <b>CO 4</b>  | Be aware of the counting principles.   |          |          |          |          |
| <b>CO 5</b>  | Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.  |          |          |          |          |
| <b>R2017</b> | <b>CS8351 DIGITAL PRINCIPLES AND SYSTEM DESIGN</b>   | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|              |  | <b>4</b> | <b>0</b> | <b>0</b> | <b>4</b> |
| <b>CO 1</b>  | Simplify Boolean functions using Kmap  |          |          |          |          |
| <b>CO 2</b>  | Design and Analyze Combinational and Sequential Circuits   |          |          |          |          |
| <b>CO 3</b>  | Implement designs using Programmable Logic Devices   |          |          |          |          |
| <b>CO 4</b>  | Write HDL code for combinational and Sequential Circuits   |          |          |          |          |
| <b>R2017</b> | <b>CS8391 DATA STRUCTURES</b>  | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|              |  | <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |



packages and interfaces.

**CO 2** Develop and implement Java programs with arraylist, exception handling and multithreading .

**CO 3** Design applications using file processing, generic programming and event handling.

**R2017**

**CS8382 DIGITAL SYSTEMS LABORATORY**

**L T P C**

**0 0 4 2**

**CO 1** Implement simplified combinational circuits using basic logic gates

**CO 2** Implement combinational circuits using MSI devices

**CO 3** Implement sequential circuits like registers and counters

**CO 4** Simulate combinational and sequential circuits using HDL

**L T P C**

**R2017**

**HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING**

**0 0 2 1**

**CO 1** Listen and respond appropriately.

**CO 2** Participate in group discussions

**CO 3** Make effective presentations

**CO 4** Make effective presentations

**CO 5** Participate confidently and appropriately in conversations both formal and informal

**L T P C**

**R2017**

**MA8402 PROBABILITY AND QUEUING THEORY**

**4 0 0 4**

**CO 1** Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon

**CO 2** Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.

**CO 3** Apply the concept of random processes in engineering disciplines.

**CO 4** Acquire skills in analyzing queueing models.

**CO 5** Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner

**R2017**

**CS8491 COMPUTER ARCHITECTURE**

**L T P C**

|              |   |                |
|--------------|---|----------------|
|              |   | <b>3 0 0 3</b> |
| <b>CO 1</b>  | Understand the basics structure of computers, operations and instructions.            |                |
| <b>CO 2</b>  | Design arithmetic and logic unit.   |                |
| <b>CO 3</b>  | Understand pipelined execution and design control unit.                               |                |
| <b>CO 4</b>  | Understand parallel processing architectures.   |                |
| <b>CO 5</b>  | Understand the various memory systems and I/O communication.                          |                |
| <b>R2017</b> | <b>CS8492 DATABASE MANAGEMENT SYSTEMS</b>   | <b>L T P C</b> |
|              |   | <b>3 0 0 3</b> |
| <b>CO 1</b>  | Classify the modern and futuristic database applications based on size and complexity |                |
| <b>CO 2</b>  | Map ER model to Relational model to perform database design effectively               |                |
| <b>CO 3</b>  | Write queries using normalization criteria and optimize queries                       |                |
| <b>CO 4</b>  | Compare and contrast various indexing strategies in different database systems        |                |
| <b>CO 5</b>  | Appraise how advanced databases differ from traditional databases.                    |                |
| <b>R2017</b> | <b>CS8451 DESIGN AND ANALYSIS OF ALGORITHMS</b>                                       | <b>L T P C</b> |
|              |   | <b>3 0 0 3</b> |
| <b>CO 1</b>  | Design algorithms for various computing problems.                                     |                |
| <b>CO 2</b>  | Analyze the time and space complexity of algorithms                                   |                |
| <b>CO 3</b>  | Critically analyze the different algorithm design techniques for a given problem.     |                |
| <b>CO 4</b>  | Modify existing algorithms to improve efficiency.                                     |                |
| <b>R2017</b> | <b>CS8493 OPERATING SYSTEMS</b>   | <b>L T P C</b> |
|              |   | <b>3 0 0 3</b> |
| <b>CO 1</b>  | Analyze various scheduling algorithms.  |                |
| <b>CO 2</b>  | Understand deadlock, prevention and avoidance algorithms.                             |                |
| <b>CO 3</b>  | Compare and contrast various memory management schemes.                               |                |
| <b>CO 4</b>  | Understand the functionality of file systems.   |                |
| <b>CO 5</b>  | Perform administrative tasks on Linux Servers   |                |
| <b>CO 6</b>  | Compare iOS and Android Operating Systems.  |                |
| <b>R2017</b> | <b>CS8494 SOFTWARE ENGINEERING</b>  | <b>L T P C</b> |

3 0 0 3

- CO 1 Identify the key activities in managing a software project.
- CO 2 Compare different process models.
- CO 3 Concepts of requirements engineering and Analysis Modeling.
- CO 4 Apply systematic procedure for software design and deployment.
- CO 5 Compare and contrast the various testing and maintenance.
- CO 6 Compare and contrast the various testing and maintenance and Compare and contrast the various testing and maintenance.
- CO 7 Manage project schedule, estimate project cost and effort required.

R2017

**MA8551 ALGEBRA AND NUMBER THEORY**

L T P C  
4 0 0 4

- CO 1 Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
- CO 2 Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
- CO 3 Demonstrate accurate and efficient use of advanced algebraic techniques.
- CO 4 Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text
- CO 5 Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

R2017

**CS8591 COMPUTER NETWORKS**

L T P C  
3 0 0 3

- CO 1 Understand the basic layers and its functions in computer networks.
- CO 2 Evaluate the performance of a network
- CO 3 Understand the basics of how data flows from one node to another.
- CO 4 Analyze and design routing algorithms
- CO 5 Design protocols for various functions in the network and Understand the working of various application layer protocols.

R2017

**EC8691 MICROPROCESSORS AND MICROCONTROLLERS**

L T P C  
3 0 0 3

- CO 1 Understand and execute programs based on 8086 microprocessor.
- CO 2 Design Memory Interfacing circuits.



- CO 3 Design and interface I/O circuits.
- CO 4 Design and implement 8051 microcontroller based systems.

|              |   |                |
|--------------|---|----------------|
| <b>R2017</b> | <b>CS8501 THEORY OF COMPUTATION</b>                     | <b>L T P C</b> |
|              |   | <b>3 0 0 3</b> |
| <b>CO 1</b>  | Construct automata, regular expression for any pattern. |                |
| <b>CO 2</b>  | Write Context free grammar for any construct.           |                |
| <b>CO 3</b>  | Design Turing machines for any language.                |                |
| <b>CO 4</b>  | Propose computation solutions using Turing machines.    |                |
| <b>CO 5</b>  | Derive whether a problem is decidable or not.           |                |

|              |   |                |
|--------------|---|----------------|
| <b>R2017</b> | <b>CS8592 OBJECT ORIENTED ANALYSIS AND DESIGN</b>                                   | <b>L T P C</b> |
|              |   | <b>3 0 0 3</b> |
| <b>CO 1</b>  | Express software design with UML diagrams   |                |
| <b>CO 2</b>  | Design software applications using OO concepts.                                     |                |
| <b>CO 3</b>  | Identify various scenarios based on software requirements                           |                |
| <b>CO 4</b>  | Transform UML based software design into pattern based design using design patterns |                |
| <b>CO 5</b>  | Understand the various testing methodologies for OO software                        |                |

|              |   |                |
|--------------|---|----------------|
| <b>R2017</b> | <b>CS8651 INTERNET PROGRAMMING</b>  | <b>L T P C</b> |
|              |   | <b>3 0 0 3</b> |
| <b>CO 1</b>  | Construct a basic website using HTML and Cascading Style Sheets.  |                |
| <b>CO 2</b>  | Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms. |                |
| <b>CO 3</b>  | Develop server side programs using Servlets and JSP.  |                |
| <b>CO 4</b>  | Construct simple web pages in PHP and to represent data in XML format.  |                |
| <b>CO 5</b>  | Use AJAX and web services to develop interactive web applications   |                |



**R2017**

**CS8603 DISTRIBUTED SYSTEMS**

**L T P C**  
**3 0 0 3**

- CO 1 Elucidate the foundations and issues of distributed systems
- CO 2 Understand the various synchronization issues and global state for distributed systems.
- CO 3 Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems
- CO 4 Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
- CO 5 Describe the features of peer-to-peer and distributed shared memory systems

**R2017**

**MG8591 PRINCIPLES OF MANAGEMENT**

**L T P C**  
**3 0 0 3**

- CO 1 Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

**R2017**

**CS8792 CRYPTOGRAPHY AND NETWORK SECURITY**

**L T P C**  
**3 0 0 3**

- CO 1 Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
- CO 2 Apply the different cryptographic operations of symmetric cryptographic algorithms
- CO 3 Apply the different cryptographic operations of public key cryptography
- CO 4 Apply the various Authentication schemes to simulate different applications.
- CO 5 Understand various Security practices and System security standards

**R2017**

**CS8791 CLOUD COMPUTING**

**L T P C**  
**3 0 0 3**

- CO 1 Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
- CO 2 Learn the key and enabling technologies that help in the development of cloud.

- CO 3 Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
- CO 4 Explain the core issues of cloud computing such as resource management and security.
- CO 5 Be able to install and use current cloud technologies.
- CO 6 Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

|              |   |          |          |          |          |
|--------------|---|----------|----------|----------|----------|
| <b>R2017</b> | <b>IT8075 SOFTWARE PROJECT MANAGEMENT</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
|              |   | <b>3</b> | <b>0</b> | <b>0</b> | <b>3</b> |

- CO 1 Understand Project Management principles while developing software.
- CO 2 Gain extensive knowledge about the basic project management concepts, framework and the process models.
- CO 3 Obtain adequate knowledge about software process models and software effort estimation techniques.
- CO 4 Estimate the risks involved in various project activities.
- CO 5 Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.
- CO 6 Learn staff selection process and the issues related to people management