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Counseling code: **MHVR,** University Code: **E3**

COMPUTER SCIENCE & ENGINEERING

Program : B.Tech-Computer Science & Engineering			**Academic Year :** 2020-21	**Semester :** I & II
S.No	**Year /Sem**	**Course Code**	**Course Name**	**Course Outcomes**
1	**II/I**	**CS301ES**	**Analog and Digital Electronics**	**CO 1:** Acquire knowledge of electrical characteristics of ideal and practical diodes under forward and reverse bias to analyze and design diode application circuits such as rectifiers.
				CO 2: Utilize operational principles of bipolar to derive appropriate small-signal models and use them for the analysis of basic circuits.
				CO 3: Understand the basic concept of number systems, Boolean algebra principles.
				CO 4: Understand minimization techniques for Boolean algebra.
				CO 5: Analyze Combination logic circuit such as multiplexers, adders, decoders.
2	**II/I**	**CS302PC**	**Data Structures**	**CO 1:** Choose appropriate data structures to represent data items.
				CO 2: Analyze the time and space complexities of algorithms.
				CO 3: Design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs and B-trees.
				CO 4: Analyze and implement various kinds of searching and sorting methods.
				CO 5: Describe how arrays, linked structures, stacks, queues, trees, and graphs are represented in memory.
3	**II/I**	**MA303BS**	**Computer Oriented Statistical Methods**	**CO 1:** Describe the conditional probability and state the Baye's theorem and solve its applications.
				CO 2: Solve the problems on random variables and compare the difference between probability distributions.
				CO 3: Construct the area of normal curve and distinguish binominal, gamma and exponential distributions.
				CO 4: Formulate the sampling distribution of

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				means and sampling distribution of variances.
				CO 5: Classify the methods of estimations and errors of estimations.
4	**II/I**	**CS304PC**	**Computer Organization and Architecture**	**CO 1:** Describe basics of computer organization and register transfer languages and micro operations such as arithmetic, logic, shift micro operations.
				CO 2: Explain about computer instructions, computer registers and instruction cycle and interrupt cycle.
				CO 3: Describe the design of control unit with address sequencing and microprogramming concept and CPU with instruction formats, addressing modes and types of instructions such as data transfer, manipulation and program control.
				CO 4: Describe various data representations and explain how arithmetic operations are performed by computer.
				CO 5: Illustrate the concepts of Input-Output Organization and Memory Organization.
5	**II/I**	**CS305PC**	**Object Oriented Programming using C++**	**CO 1:** Develop application for a range of problem using object oriented programming concepts.
				CO 2: Construct programs on various methodology using class and object.
				CO 3: Illustrate the different forms of inheritance.
				CO 4: Construct and develop programs with reusability using polymorphism and virtual function.
				CO 5: Develop programs for file handling.
6	**II/I**	**CS306ES**	**Analog & Digital Electronics Lab**	**CO 1:** Know the characteristics of various components.
				CO 2: Understand the utilization of components.
				CO 3: Design and analyze small signal amplifier circuits.
				CO 4: Postulates of Boolean algebra and to minimize combinational functions.
				CO 5: Design and analyze combinational and sequential circuits.
7	**II/I**	**CS307PC**	**Data Structures Lab**	**CO 1:** Summarize different categories of data Structures.

				CO 2: Analyze the performance of an algorithm.
				CO 3: Develop C programs for computing control statements.
				CO 4: Understand C programs for computing arrays, functions, pointers, strings.
				CO 5: Understand stacks, queues and linked lists.
8	**II/I**	**CS308PC**	**IT Workshop Lab**	**CO 1:** Identify the parts of CPU and able to learn knowledge for computer assembling and disassembling.
				CO 2: Resolve the Software installation.
				CO 3: Ability to solve the trouble shooting problems.
				CO 4: Apply the techniques and netiquettes while using internet.
				CO 5: Model a web page by using HTML
9	**II/I**	**CS309PC**	**C++ Programming Lab**	**CO 1:** Identify and able to develop applications for a range of problems on operators such as scope resolution and new delete memory allocation.
				CO 2: Write a basic concepts on initializing and displaying contents of class member and structure of class.
				CO 3: Develop basic programs on inheritance.
				CO 4: Identify and able to do programs to use pointer for both base and derived classes and call the member function by using Virtual keyword.
				CO 5: Develop basic programs on console i/o operations.
10	**II/I**	**MC309**	**Gender Sensitization Lab**	**CO 1:** Develop sensibility with regard to issues of gender in contemporary India.
				CO 2: Provide a critical perspective on the socialization of men and women.
				CO 3: Determine information about some key biological aspects of genders.
				CO 4: Debate on the politics and economics of work.
				CO 5: Reflect critically on gender violence.
11	**II/II**	**CS401PC**	**Discrete Mathematics**	**CO 1:** Understand and construct precise mathematical proofs.
				CO 2: Use logic and set theory to formulate precise statements.
				CO 3: Analyze and solve counting problems

				on finite and discrete structures.
				CO 4: Describe and manipulate sequences.
				CO 5: Apply graph theory in solving computing problems.
12	**II/II**	**SM402MS**	**Business Economics & Financial Analysis**	**CO 1:** The students will understand various forms of Business and the impact of economic variables on the business.
				CO 2: Understand the significance of elasticity of demand and its forecasting, law of demand and its exceptions and supply analysis.
				CO 3: Understand production analysis function with different variables and cost analysis functions.
				CO 4: To adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts.
				CO 5: Understand the Ratio analysis to give an idea about financial forecasting, financial planning, controlling and decision making.
13	**II/II**	**CS403PC**	**Operating Systems**	**CO 1:** Describe operating system goals and functions.
				CO 2: Get the knowledge of process, various CPU scheduling algorithms and synchronization.
				CO 3: Analyze the methods for handling deadlocks.
				CO 4: Understand the memory management and several page replacement algorithms.
				CO 5: Classify the storage management and file system implementation.
14	**II/II**	**CS404PC**	**Database Management Systems**	**CO1:** Identify and understand the underlying concepts of database techniques and query a database using DML/DDL commands and able to design entity relationship diagrams.
				CO 2: Explain the concepts of relational data model, entity- relationship model and relational database design.
				CO 3: Apply relational algebra and calculus, understands the use of sql and learns sql syntax.
				CO 4: Develop and improve database

				design by normalization.
				CO 5: Define transaction and understand its properties. Learns techniques for controlling the consequences of concurrent data access.
15	**II/II**	**CS405PC**	**Java Programming**	**CO 1:** Analyze Object Oriented Programming Concepts.
				CO 2 : Develop the Abstract Classes and know the importance of the Inheritance, Encapsulation and Polymorphism.
				CO 3: Implementing interfaces and creating packages and create files and directories using g Java I/O Streams.
				CO 4: Get the importance of Exception handling and knowledge of multithreading and java collection classes concepts.
				CO 5: Design web applications by using applets and swings.
16	**II/II**	**CS406PC**	**Operating Systems Lab**	**CO 1:** Develop programs on CPU scheduling algorithms.
				CO 2: Construct the programs on file organisation and file allocation techniques.
				CO 3: Solve deadlock avoidance and deadlock prevention using Bankers' algorithm.
				CO 4: Classify and construct programs on memory management techniques.
				CO 5: Develop application programs using system calls.
17	**II/II**	**CS406PC**	**Database Management Systems Lab**	**CO 1:** Identify and understand the underlying relational data model, entity-relationship model and relational database design.
				CO 2: Develop and improve database design by normalization.
				CO 3: Identify and understand the underlying concepts of database techniques and query a database using DML/DDL commands.
				CO 4: Identify and understands the use of sql and learns sql syntax of set difference operators and joins.
				CO 5: Write basic database query using Aggregate operators.
18	**II/II**	**CS408PC**	**Java Programming Lab**	**CO 1:** Construct the programs for Abstract classes, Inheritance and Interface.
				CO 2: Write the program for Multithreading

				and Files operations.
				CO 3: Prepare the programs for applets.
				CO 4: Develop the basic applications by using Swing components.
				CO 5: Construct the programs for collection Framework.
19	**II/II**	**MC409**	**Constitution of India**	**CO 1:** Understand meaning, features, characteristics of constitution law and constitutionalism.
				CO 2: Describe fundamental rights, fundamental duties and its legal status.
				CO 3: Describe The constitution powers and status of the President of India.
				CO 4: Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency.
				CO 5: Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19.
20	**III/I**	**CS501PC**	**Formal Languages and Automata Theory**	**CO 1:** Able to understand the concept of abstract machines and their power to recognize the languages.
				CO 2: Able to employ finite state machines for modeling and solving computing problems.
				CO 3: Able to design context free grammars for formal languages.
				CO 4: Able to distinguish between decidability and undecidability.
				CO 5: Able to gain proficiency with mathematical tools and formal methods.
21	**III/I**	**CS502PC**	**Software Engineering**	**CO 1:** Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document.
				CO 2: Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
				CO 3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report.
				CO4:Compare Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM

				plan
				CO5:Contrast Creating an architectural design: software architecture, data design, architectural styles and patterns.
22	**III/I**	**CS503PC**	**Computer Networks**	**CO1:** Gain the knowledge of the basic computer network technology
				CO2:Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
				CO 3: Obtain the skills of subnetting and routing mechanisms.
				CO 4: Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation
				CO 5::Analyze the data link layer protocols by Analyse
23	**III/I**	**CS504PC**	**Web Technologies**	**CO 1**: gain knowledge of client-side scripting, validation of forms and AJAX programming
				CO 2:understand server-side scripting with PHP language
				CO 3: understand what is XML and how to parse and use XML Data with Java
				CO 4:To introduce Server-side programming with Java Servlets and JSP
				CO 5: Use XAMP Stack for web applications
24	**III/I**	**CS511PE**	**Informational Retrieval System**	**CO 1:**Learn measurement of information and errors
				CO 2: Understand the significance of codes in various applications
				CO 3: Obtain knowledge in designing various source codes and channel codes
				CO 4: Contrast applications of block codes for Error control in data storage system
				CO 5: Explain Structural and Distance Properties, state, tree, trellis diagrams, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes
25	**III/I**	**CS515PE**	**Principles of Programming Languages**	**CO 1**: Compare different Programming Domains
				CO 2: Choose Specific Programming Language for the Development of Specific Applications
				CO 3: Acquire the skills for expressing syntax and semantics in formal notation
				CO4: Identify and apply a suitable programming paradigm for a given computing application
				CO5: Gain knowledge of and able to compare the

				features of various programming languages
26	**III/I**	**CS523PE**	**Informational Retrieval System**	**CO 1:** Ability to apply IR principles to locate relevant information large collections of data
				CO 2: Design an Information Retrieval System for web search tasks.
				CO 3: Implement retrieval systems for web search tasks
				CO 4: Ability to design different document clustering algorithms
				CO 5:Explain text search techniques software text search algorithms and hardware text search systems
27	**III/I**	**CS505PC**	**Software Engineering Lab**	**CO 1:**Ability to translate end-user requirements into system and software requirements
				CO 2: Ability to generate a high-level design of the system from the software requirements
				CO 3: Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
				CO 4: Understand the software engineering methodologies involved in the phases for project
				CO 5: Exercise developing product-start-ups
28	**III/I**	**CS506PC**	**Computer Networks And Web Technologies Lab**	**CO 1:** Implement and analyze routing and congestion issues in network design.
				CO 2: Implement Encoding and Decoding techniques used in presentation layer
				CO 3: Implement data link layer farming methods
				CO 4: To be able to work with different network tools
				CO 5: Compare and implement various kinds of encryption and decryption techniques.
29	**III/II**	**CS601PC**	**Machine Learning**	**CO 1:**Understand the concepts of computational intelligence like machine learning
				CO 2: Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
				CO 3: Understand the Neural Networks and its usage in machine learning application.
				CO 4:Illustrate the Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses,

				comparing learning algorithms.
				CO 5: Ability to neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.
30	**III/II**	**CS602PC**	**Compiler Design**	**CO 1:** Describe structure of a compiler and basics of programming languages.
				CO 2: Design Lexical analyzer generator by using regular expressions and finite automata.
				CO 3: Design and implement LL and LR parsers and use
				CO 4: Identify the storage organization used to support the run-time environment of a program and effectively
				CO 5: Demonstrate the ability to design a compiler given a set of language features.
31	**III/II**	**CS603PC**	**Design And Analysis Of Algorithams**	**CO 1:**Analyze the Performance of an Algorithm.
				CO 2: Solve the problems using divide and conquer approach.
				CO 3: Develop constraint satisfied solutions using
				CO 4: Evaluate feasible solutions using Greedy method.
				CO 5: Developing solutions to problems using dynamic
32	**III/II**	**CS613PE**	**Scripting Languages**	**CO 1**: Comprehend the differences between typical scripting languages and typical system and application programming languages.
				CO 2: Gain knowledge of the strengths and weakness of Perl, TCL and Ruby; and select an appropriate language for solving a given problem.
				CO 3: Acquire programming skills in scripting language
				CO 4: Develop the web applications master and understanding of python especially the object oriented
				CO 5: Illustrate the principles of linux networking in Linux RHEL6/7/ubuntu operating systems.
33	**III/II**	**MC609**	**Environmental Science**	**CO 1:**Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn

				helps in sustainable development
				CO 2: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems
				CO 3: Scope and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids
				CO4: Explain genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values
				CO5: Illustrate the Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management
34	**III/II**	**CS604PC**	**Machine Learning Lab**	**CO 1:** understand complexity of Machine Learning algorithms and their limitations;
				CO 2: understand modern notions in data analysis-oriented computing;
				CO 3: be capable of confidently applying common Machine Learning algorithms in practice and implementing their own;
				CO 4: Be capable of performing experiments in Machine Learning using real-world data.
				CO 5: Design application using TCL/TK scripts for
35	**III/II**	**CS623PE**	**Scripting Languages Lab**	**CO 1:**Ability to understand the differences between Scripting languages and programming languages
				CO 2: Able to gain some fluency programming in Ruby, Perl, TCL
				CO 3: Ruby Objects in C, the Jukebox extension, Memory allocation, Ruby Type System, Embedding Ruby to Other Languages, Embedding a Ruby Interperter
				CO 4:Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages
				CO 5: Illustrate the Tk-Visual Tool Kits, Fundamental Concepts of Tk, Tk by example, Events and Binding, Perl-Tk
36	**IV/I**	**137BQ**	**Data Mining**	**CO 1:** Analyze various data base techniques

				for data warehouse and able to perform OLAP Operations.
				CO 2: Ability to perform the Pre-processing of data and apply mining techniques on data.
				CO 3: Understand frequent set and apply association Rule on Data Set.
				CO 4: Evaluate the data mining ask like Classification, Regression Clustering on large data set.
				CO 5: Ability to solve real world Problems in business and scientific information using data mining.
37	**IV/I**	**137GA**	**Principles of Programming Languages**	**CO 1:** Express the important features of the Programming Languages.
				CO 2: Develop the skills for expressing syntax and semantics in formal notation.
				CO 3: Compare different Programming Domains.
				CO 4: Choose Specific Programming Language for the Development of Specific Applications.
				CO 5: Analyze the Importance of Implementation Process.
38	**IV/I**	**137GD**	**Python Programming**	**CO 1:** Examine python syntax and semantics and be fluent in the use of python flow control and functions.
				CO 2: Demonstrate proficiency in handling strings and file systems.
				CO 3: Create run and manipulate python programs using core data structures like lists, dictionaries and use regular expressions.
				CO 4: Interpret the concepts of object oriented programming as used in python.
				CO 5: Recognize exemplary applications related to network programming and web services.
39	**IV/I**	**137HB**	**SOFTWARE PROCESS AND PROJECT MANAGEMENT**	**CO 1:** Gain knowledge of software economics, phases in the life cycle of software development, project organization, project control and process instrumentation
				CO 2: Analyze the major and minor milestones, artifacts and metrics from management and technical perspective
				CO 3: Design and develop software product using conventional and modern principles of software project management

				CO 4:Illustrate The seven-core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.
				CO 5: Explain Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments.
40	**IV/I**	**137BC**	**Cloud Computing**	**CO 1:** Distinguish different types of Distributed System models and enabling technologies.
				CO 2: Ability to perform four cloud deployment models.
				CO 3: Ability to manage cloud applications, migrate applications to cloud.
				CO 4: Explore the Iaas service providers, Paas, Saas service providers.
				CO 5: Originates and manage applications on Amazon Web Services cloud.
41	**IV/I**	**13707**	**Data Mining Lab**	**CO 1:** Add mining algorithms as a component to the exiting tools.
				CO 2: Apply mining techniques for realistic data.
				CO3: Perform the Pre-processing of data and apply mining techniques on data.
				CO4: Understand frequent set and apply association Rule on Data Set.
				CO5: Evaluate the data mining ask like Classification, Regression Clustering on large data set.
42	**IV/I**	**13730**	**Python Programming Lab**	**CO 1:** Student should be able to understand the basic concepts scripting and the Contributions of scripting language.
				CO 2: Ability to explore python especially the object oriented concepts, and the built in Objects of Python.
				CO 3: Understand the concept of modules in python script.
				CO 4: Handling the files using python.
				CO 5: Ability to create practical and contemporary applications such as Web applications.
43	**IV/I**	**13737**	**Industry Oriented Mini Project**	**CO 1:** Apply fundamental concepts and methods of their engineering field.
				CO 2: Use effectively oral, written and visual communication.
				CO 3: Understand working with teams.

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44	**IV/I**	**13767**	**Seminar**	**CO 1:** Understand advanced research methodologies in the field of computer science engineering.
				CO 2: Demonstrate their understanding of discussions and spark further discussion.
				CO 3: Identify understand and discuss current issues in the engineering field.
45	**IV/II**	**138DK**	**Modern Software Engineering**	**CO 1:** To provide the idea of decomposing the given problem into Analysis, Desing, Implementation, Testing and Maintenance phases
				CO 2: To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.
				CO 3: a solid understanding to the methods of modern software engineering
				CO 4: the ability to build and configure major operating system components
				CO5: To provide an advanced understanding and knowledge of the software engineering techniques, techniques to collect software requirements from client
46	**IV/II**	**138BE**	**Computer Forensics**	**CO 1:** Understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations.
				CO 2: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.
				CO 3:understanding acquisition procedures for cell phones and mobile devices.
				CO 4: Able to evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations:
				CO 5: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene
47	**IV/II**	**138GW**	**RENEWABLE ENERGY SOURCES**	**CO 1:** Understanding of renewable energy sources
				CO 2: Knowledge of working principle of various energy systems

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				CO 3: Capability to carry out basic design of renewable energy systems
				CO 4: Understand the principles of wind power and solar photovoltaic power generation, fuel cells.
				CO 5 : Analyze the issues involved in the integration of renewable energy sources to the grid.
48	**IV-II**	**13805**	**Major Project**	**CO 1:** Analyze engineering problems, identify an appropriate solution, implement the methodology and propose a meaningful solution.
				CO 2: Develop confidence for self-education and ability for lifelong learning**.**
				CO 3: Plan, analyze, design a software project and demonstrate the ability
				CO 4: Introduce with major software engineering topics and position them
				CO5: Learn to work as a team and to focus on getting a working project done within a stipulated period of time.

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