PROGRAMME: COMPUTER SCIENCE AND ENGINEERING -CYBER SECURITY
JNTUK UNIVERSITY REGULATION R20
FIRST YEAR COURSES (I & II SEMISTER)
Course Outcome's (Co's)
I-I & I-II

C101	MATHEMATICS-1

Course Outcomes (Cos)

101.1	utilize mean value theorems to real life problems
101.2	solve the differential equations related to various engineering fields
101.3	familiarize with functions of several variables which is useful in optimization
101.4	Apply double integration techniques in evaluating areas bounded by region
101.5	students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems

C102	APPLIED PHYSICS

Course Outcomes (Cos)

102.1	Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications. Classify ordinary refracted light and extraordinary refracted rays by their states of polarization
102.2	Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers Explain the working principle of optical fibers Classify optical fibers based on refractive index profile and mode of propagation . Identify the applications of optical fibers in medical, communication and other fields. Apply the fiber optic concepts in various fields .
102.4	Explain the concept of dielectric constant and polarization in dielectric materials . Summarize various types of polarization of dielectrics . Interpret Lorentz field and Claussius-Mosotti relation in dielectrics . Classify the magnetic materials based on susceptibility and their temperature dependence . Explain the applications of dielectric and magnetic materials .

102.5	Outline the properties of charge carriers in semiconductors . Identify the type of semiconductor using Hall effect . Identify applications of semiconductors in electronic devices . Classify superconductors based on Meissner's effect . Explain Meissner's effect, BCS theory & Josephson effect in superconductors .

C103	COMMUNICATIVE ENGLISH

Course Outcomes (Cos)

103.1	understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
103.2	ask and answer general questions on familiar topics and introduce oneself/others
103.3	employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
103.4	recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
103.5	form sentences using proper grammatical structures and correct word forms

C104	PROGRAMMING FOR PROBLEM SOLVING USING C

Course Outcomes (Cos)

104.1	To write algorithms and to draw flowcharts for solving problems
104.2	To convert flowcharts/algorithms to C Programs, compile and debug programs
104.3	To use different operators, data types and write programs that use two-way/ multi-way selection
104.4	To select the best loop construct for a given problem
104.5	To design and implement programs to analyze the different pointer applications

C105	ENGLISH COMMUNICATION SKILLS LABORATORY

Course Outcomes (Cos)

105.1	Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
105.2	English Pronunciation in use- Mark Hancock, Cambridge University Press.
105.3	English Phonetics and Phonology-Peter Roach, Cambridge University Press.
105.4	English Pronunciation in use- Mark Hewings, Cambridge University Press.
105.5	English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
105.6	English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications

C106	APPLIED PHYSIC LAB

Course Outcomes (Cos)

106.1	Determination of thickness of thin object by wedge method.
106.2	Determination of radius of curvature of a given plano convex lens by Newton's rings.
106.3	Determination of wavelengths of different spectral lines in mercury spectrumusing diffraction grating in normal incidence configuration.
106.4	Determination of dispersive power of the prism.
106.5	Determination of dielectric constant using charging and discharging method.
106.6	Study the variation of B versus H by magnetizing the magnetic material (B-H curve).

C107	PROGRAMMING FOR PROBLEM SOLVING USING C LAB

Course Outcomes (Cos)

107.1	Gains Knowledge on various concepts of a C language.
107.2	Able to draw flowcharts and write algorithms.
107.3	Able design and development of C problem solving skills.
107.4	Able to design and develop modular programming skills.
107.5	Able to trace and debug a program

C108	MATHEMATICS - II

Course Outcomes (Cos)

108.1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications
108.2	Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel
108.3	Evaluate approximating the roots of polynomial and transcendental equations by different algorithms
108.4	Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals
108.5	Apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations

C109	APPLIED CHEMISTRY

Course Outcomes (Cos)

109.1	Synthesize nano- materials for modern advances of engineering technology.
109.2	Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductor

C110	COMPUTER ORGANIZATION

Course Outcomes (Cos)

110.1	Demonstrate and understanding of the design of the functional units of a digital computer system
110.2	Relate Postulates of Boolean algebra and minimize combinational functions
110.3	Recognize and manipulate representations of numbers stored in digital computers.
110.4	Build the logic families and realization of logic gates.
110.5	Design and analyze combinational and sequential circuits.

C111	PYTHON PROGRAMMING

Course Outcomes (Cos)

111.1	Develop essential programming skills in computer programming concepts like data types, containers
111.2	Apply the basics of programming in the Python language
111.3	Solve coding tasks related conditional execution ,loops

111.4	Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming

C112	APPLIED CHEMISTRY LAB

Course Outcomes (Cos)

112.1	The students entering into the professional course have practically very little exposure to lab classes
112.2	The experiments introduce volumetric analysis
112.3	redox titrations with different indicators. \;; EDTA titrations
112.4	then they are exposed to a few instrumental methods of chemical analysis
112.5	at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments.

C113	PYTHON PROGRAMMING LAB

Course Outcomes (Cos)

113.1	Develop essential programming skills in computer programming concepts like data types, containers
113.2	Apply the basics of programming in the Python language
113.3	Solve coding tasks related conditional execution ,loops
113.4	Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming

C114	DATA STRUCTURES LAB

Course Outcomes (Cos)

114.1	Use basic data structure such as array sand linked list.
114.2	Programs to demonstrate fundamental algorithmic
114.3	Problems including Tree Traversals, Graph traversals, and shortest paths
114.4	Use various searching and sorting algorithms

C115	ENVIRONMENT SCIENCE

Course Outcomes (Cos)

1165.1	Over all understanding of the natural resources.
115.2	Basic understanding of the ecosystem and its diversity.
115.3	Acquaintance on various environmental challenges induced ue to unplanned anthropogenic activities.
115.4	An understanding of the environmental impact of developmental activities.
115.5	Awareness on the social issues, environmental legislation and global treaties.

PROGRAMME: COMPUTER SCIENCE AND ENGINEERING - CYBER SECURITY
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SECOND YEAR COURSES (I & II SEMISTER)
Course Outcome's (Co's)
II-I & II-II

C201	MATHEMATICS - III

Course Outcomes (Cos)

C201.1	Interpret the physical meaning of different operators such as gradient, curl and divergence(L5)
C201.2	Estimate the work done against a field, circulation and flux using vector calculus (L5)
C201.3	Apply the Laplace transform for solving differential equations(L3)
C201.4	Find or compute the Fourier series of periodic signals(L3)
C201.5	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms(L3)
C201.6	Identify solution methods for partial differential equations that model physical processes(L3)

C202	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Course outcomes (cos)

C202.1	Demonstrate skills in solving mathematical problems
C202.2	Comprehend mathematical principles and logic
C202.3	Demonstrate knowledge of mathematical modeling and proficiency in using mathematical
C202.4	software Manipulate and analyze data numerically and/or graphically using appropriate Software
C202.5	Communicate effectively mathematical ideas/results verbally or in writing

C202	DATA STRCUTURE

Course Outcomes (Cos)

C203.1	Summarize the properties, interfaces, and behaviors of basic abstract data types
C203.2	Discuss the computational efficiency of the principal algorithms for sorting &searching
C203.3	Use arrays, records, linked structures ,stacks ,queues, trees, and Graphs in writing programs
C203.4	Demonstrate different methods for traversing trees

C204	OPERATING SYSTEMS

Course Outcomes (Cos)

C204.1	Describe various generations of Operating System and functions of Operating System
C204.2	Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance
C204.3	Solve Inter Process Communication problems using Mathematical Equations by various methods
C204.4	Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques
C204.5	Outline File Systems in Operating System like UNIX/Linux and Windows

C205	JAVA PROGRAMMING

Course Outcomes (Cos)

C205.1	Able to realize the concept of Object Oriented Programming& Java Programming Constructs
C205.2	Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
C205.3	Apply the concept of exception handling and Input/ Output to operations
C205.4	Able to design the applications of Java& Java applet
C205.5	Able to Analyze& Design the concept of Event Handling and Abstract Window Toolkit

C206	DATA STRUCTURES LAB

Course Outcomes (Cos)

C206.1	Use basic data structure such as array sand linked list.
C206.2	Programs to demonstrate fundamental algorithmic
C206.3	Problems including Tree Traversals, Graph traversals, and shortest paths
C206.4	Use various searching and sorting algorithms

C207	OS&UNIX PROGRAMMING LAB

Course Outcomes (Cos)

C207.1	able to run various UNIX commands on a standard UNIX/LINUX Operating
C207.2	able to run C / C++ programs on UNIX.
C207.3	able to do shell programming on UNIX OS.
C207.4	able to understand and handle UNIX system calls.

C208	JAVA PROGRAMMING LAB

Course Outcomes (Cos)

C208.1	Evaluate default value of all primitive data type, Operations ,Expressions ,Control-flow, Strings
C208.2	Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
C208.3	Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
C208.4	Construct Threads, Event Handling ,implement packages, developing applets

C210	DATABASE MANAGEMENT SYSTEMS

Course Outcomes (Cos)

C210.1	Describe are national database and object-oriented database
C210.2	Create ,maintain and manipulate are national database using SQL
C210.3	Describe ER model and normalization for database design
C210.4	Examine issues in data storage and query processing and can formulate appropriate solution
C210.5	Outline the role and issues in management of data such a sufficiency ,privacy, security, ethical responsibility, and strategic advantage

C211	FORMAL LANGUAGES AND AUTOMATA THEORY

Course Outcomes (Cos)

C211.1	Classify machines by their power tor recognize languages.
C211.2	Summarize language classes &grammars relationship among them with the help of Chomsky hierarchy
C211.3	Employ finite state machines to solve problems in computing
C211.4	Illustrate deterministic and non-deterministic machines
C211.5	Quote the heir archly of problems arising in the computer science

C212	JAVA PROGRAMMING

Course Outcomes (Cos)

C212.1	Able to realize the concept of Object Oriented Programming& Java Programming Constructs
C212.2	Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
C212.3	Apply the concept of exception handling and Input/ Output to operations
C212.4	Able to design the applications of Java& Java applet
C212.5	Able to Analyze& Design the concept of Event Handling and Abstract Window Toolkit

C213	PROBABILITY AND STATISTICS

Course Outcomes (Cos)

C213.1	Classify the concepts of data science and its importance
C213.2	Interpret the association of characteristics and through correlation and regression tools
C213.3	Apply discrete and continuous probability distributions
C213.4	Design the components of a classical hypothesis test
C213.5	Infer the statistical inferentia lmethods based on small and large sampling tests

C214	MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY

Course Outcomes (Cos)

C214.1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product
C214.2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs
C214.3	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units
C214.4	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
C214.5	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making

C215	DATABASE MANAGEMENT SYSTEMS LAB

Course Outcomes (Cos)

C215.1	Utilize SQL to execute queries for creating database and performing data manipulation operations
C215.2	Examine integrity constraints to build efficient data bases
C215.3	Apply Queries using Advanced Concepts of SQL
C215.4	Build PL/ SQL programs including stored procedures, functions, cursors and triggers

C216	JAVA PROGRAMMING LAB

Course Outcomes (Cos)

C216.1	Evaluate default value of all primitive data type, Operations ,Expressions ,Control-flow, Strings
C216.2	Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
C216.3	Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
C216.4	Construct Threads, Event Handling ,implement packages, developing applets

C217	R- PROGRAMMING LAB

Course Outcomes (Cos)

C217.1	Access online resources for R and import new function packages into the R workspace
C217.2	Import ,review, manipulate and summarize data-sets in R
C217.3	Explore data-sets to create test able hypotheses and identify appropriate statistical tests
C217.4	Perform appropriate statistical tests using R
C217.5	Create and edit visualizations with R

PROGRAMME: COMPUTER SCIENCE AND ENGINEERING -CYBER SECURITY
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THIRD YEAR COURSES (I & II SEMISTER)
Course Outcome's (Co's)
III-I & III-II

C301	COMPUTER NET WORKS

Course Outcomes (Cos)

C301.1	Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards.
C301.2	Discuss different transmission media and different switching networks.
C301.3	Analyze data link layer services , functions and protocols like HDLC and PPP.
C301.4	CompareandClassifymediumaccesscontrolprotocolslikeALOHA,CSMA,CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols
C301.5	Determine application year services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.

C302	COMPILER DESIGN

Course Outcomes (Cos)

C302.1	Demonstrate phases in the design of compiler
C302.2	Organize Syntax Analysis ,Top Down and grammars
C302.3	Design Bottom Up Parsing and Construction of LR parsers
C302.4	Analyze synthesized ,inherited attributes and syntax directed translation schemes
C302.5	Determine algorithms to generate code for a target machine

C303	SOFTWARE ENGINEERING

Course Outcomes (Cos)

C303.1	Compare conventional and agile software methods
C303.2	Ability to transform an Object-Oriented Design into high quality ,executable code
C303.3	Skillstodesign,implement,andexecutetestcasesattheUnitandIntegrationlevel

C304	DESIGN AND ANALYSIS OF ALGORITHMS

Course Outcomes (Cos)

C304.1	Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms
C304.2	List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method
C304.3	Synthesize efficient algorithms dynamic programming approach is to solve in common engineering design situations.
C304.4	Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches
C304.5	Demonstrate NP-Completeness theory ,lower bound theory and String Matching

C305	ENVIRONIMENTAL MANAGEMENT

Course Outcomes (Cos)

C305.1	Plan and design the water and waste water systems
C305.2	Identify the source of emissions and select proper control system
C305.3	Design and estimation of water supply system for a city
C305.4	To get knowledge about various environmental aspects
C305.5	Selection of suitable treatment flow for Raw water Treatments

C306	NETWORK PROGRAMING LAB

Course Outcomes (Cos)

C306.1	Know how reliable data communication is achieved through data link layer.
C306.2	Suggest approprite routing algorithm for the net work
C306.3	Provide internet connection to the system and its installation
C306.4	Work on various network management tools

C307	SOFT WARE ENGINEERING LAB

Course Outcomes (Cos)

C307.1	By the end of this lab the student is able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project
C307.2	Prepare SRS document, design document, test cases and software configuration management and risk management related document
C307.3	Develop function oriented and object oriented software design using tools like rational rose.
C307.4	Use modern engineering tools necessary for software project management, estimations, time management and software reuse
C307.5	Generate test cases for software testing

C308	MACHINE LEARNING

Course Outcomes (Cos)

C308.1	Explain the fundamental usage of the concept Machine Learning system
C308.2	Demonstrate on various regression Technique
C308.3	Analyze the Ensemble Learning Methods
C308.4	Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.
C308.5	Discuss the Neural Network Models and Fundamentals concepts of Deep Learning

C309	CRYPTOGRAPHY AND NETWORK SECURITY

Course Outcomes (Cos)

C309.1	Explain different security threats and counter measures and foundation course of cryptography mathematics.
C309.2	Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography
C309.3	Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more
C309.4	Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more
C309.5	Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and IP sec .

C310	INTRODUCTION TO CYBER SECURITY

Course Outcomes (Cos)

C310.1	Explain the cybercrime fundamentals
C310.2	Describe the types of attacks on network
C310.3	Analyze various tools available for cybercrime investigation
C310.4	Explain the computer forensics and investigation fundamentals and tools
C310.5	Analyze the legal perspectives of cybercrime

C311	BASICS OF SIGNALS AND SYSTEMS

Course Outcomes (Cos)

C311.1	Define signals and systems, classify the signals and apply different operations on signal.
C311.2	Explain the Force Voltage analogy and Force Current analogy.
C311.3	Determine Fourier series coefficient and Fourier transforms for different types of signals.
C311.4	Determine Laplace transforms with their properties by using the concept of ROC.
C311.5	Determine Z transforms with their properties by using the concept of ROC and relate with Laplace transform.

C312	MACHINE LEARNING LAB

Course Outcomes (Cos)

C312.1	Implement procedures for them machine learning algorithms
C312.2	Design and Develop Python programs for various Learning algorithms
C312.3	Apply appropriate datasets to the Machine Learning algorithms
C312.4	Develop Machine Learning algorithms to solve real world problems

C313	CYBER SECURITY LAB

Course Outcomes (Cos)

C313.1	Understand the various tools and methods used in cybercrime.
C313.2	dentify risk management processes, risk treatment methods, organization of information security.
C313.3	Classify cyber security solutions and information assurance.
C313.4	Examine software vulnerabilities and security solutions to reduce the risk of exploitation.
C313.5	Analyze the cyber security needs of an organization.

C314	CRYPTOGRAPHY NETWORK SECURITY LAB

Course Outcomes (Cos)

C314.1	Apply the knowledge of symmetric cryptography to implement encryption and decryption using Cease Cipher, Substitution Cipher, Hill Cipher
C314.2	Demonstrate the different algorithms like DES, Blow Fish, and Randal , encrypt the text "Hello world" using Blowfish Algorithm.
C314.3	Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm

C315	WEB APPLICATIONS DEVELOPMENT LAB

Course Outcomes (Cos)

C315.1	Develpo of the major Web application tier- Client side development
C315.2	Participate in the active development of cross-browser applications through java script
C315.3	Develop java script apllications that transition between states

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FOURTH YEAR COURSES (I & II SEMISTER)
Course Outcome's (Co's)
IV-I & IV-II

C401	DISTRIBUTED SYSTEM

Course Outcomes (Cos)

C401.1	Elucidate the foundations and issues of distributed systems
C401.2	Illustrate the various sychronization issuses and global state for distributed systems
C401.3	Illustrate the mutual exclusion and deadlock detection algorithms in distributed systems
C401.4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems
C401.5	describe the features of peer-to- peer and distributed shared memory system

C402	CLOUD COMPUTING

Course Outcomes (Cos)

C402.1	Illustrate the key dimensions of the challenge of Cloud Computing
C402.2	Classify the Levels of Virtualization and mechanism of tools.
C402.3	Analyze Cloud infrastructure including Google Cloud and Amazon Cloud.
C402.4	Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud Assess control

C403	BIG DATA ANALYSIS

Course Outcomes (Cos)

C403.1	Illustrate big data challenges in different domains including social media, transportation, finance and medicine
C403.2	use various techniques for mining data stream
C403.3	Design and develop Hadoop
C403.4	Identify the characteristics of data sets and compare the trivial data and big data for various applications
C403.5	Explore the various search methods and visualization techniques

C404	UNIVERSAL HUMAN VALUES 2

Course Outcomes (Cos)

C404.1	Development of a holistic perspective based on self-exploration about themselves (human being),family, society and nature/existence.
C404.2	Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
C404.3	Strengthening of self-reflection
C404.4	Development of commitment and courage to act.

C405	BASIC ELECTRONICS ENGINEERING

Course Outcomes (Cos)

C405.1	To give knowledge of some basic electronic components and circuits.
C405.2	To introduce basics of diode and transistor circuits
C405.3	To understand working of some I C based circuits
C405.4	To study logic gates and their usage in digital circuits.
C405.5	To introduce basic aspect of electronic communication systems.

C406	ENVIRONMENTAL MANAGEMENT

Course Outcomes (Cos)

C406.1	understand the environmental, social and economic framework in which environmental management decisions are made
C406.2	understand the life cycle perspective, systems approach and environmental technologies
C406.3	communicate proficiently in writing and speaking for promoting and coordinating public consultations on environmental matters
C406.4	Collaborate with environmental engineers, planners, technicians, and other specialists, and experts in to address environmental problems.
C406.5	recognize, evaluate, and control factors in the workplace and the environment that cause health and environmental hazards

C407	PROJECT WORK

Course Outcomes (Cos)

C407	On the completion of project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology