GNITC Regulation - R18/21

COURSE STRUCTURE AND DETAILED SYLLABUS

for

III B.TECH

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

(INTERNET OF THINGS)

(Applicable for the batches admitted from 2020-21 & 2021-22)

GURU NANAK INSTITUTIONS
TECHNICAL CAMPUS
(An Autonomous Institution)
Campus: Ibrahimpatnam, R.R. District - 501506 (T.S).

GNITC is now NAAC A+ Accredited Institute

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (INTERNET OF THINGS)

VISION OF THE DEPARTMENT

To be a leading and premier department **in the field of Internet of Things** by providing competent and highly skilled professionals to cater the needs of the industries and society.

MISSION OF THE DEPARTMENT

M1: To establish an essential environment with state of the art infrastructure and highly qualified faculty for imparting domain knowledge.

M2: To prepare the students with holistic personality by means of appropriate technical and soft skills for solving real world problems.

M3: To enrich and empower student's caliber for the positive societal contribution with emerging technologies.

M4: Extensive partnerships and collaborations with Industries for technology up-gradation.

Programme Educational Objectives (PEOs)

PEO 1: To originate the professional engineering practitioners for solving the real life industry's technological problems using exploratory and analytical skills acquired in the field of Internet of Things (IoT).

PEO 2: To connect the engineering professionals with the ability of critical thinking, analysis and design by using emerging technologies like IoT in technology development, deployment and engineering system implementation.

PEO 3: To provide the technocrats with a pleasant environment for the successful pursuing of their career in advanced education, research and development in professional manner.

Programme Outcomes (POs)

Engineering Graduates will be able to:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: 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.

PO3: 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.

PO4: 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.

PO5: 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.

PO6: 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.

PO7: 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.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: 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.

PO11: 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.

PO12: 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

Programme Specific Outcomes (PSOs)

PSO 1: To develop the culture of new emerging technologies like IoT, sensors and controllers in various applications to solve complex challenges in the real world.

PSO 2: To apply standard Internet of things based concepts and its strategies to develop advanced smart products for skill education, business and research.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)
School of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
(Internet of Things)

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GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
(INTERNET OF THINGS)

COURSE STRUCTURE
(Applicable for the batches admitted from 2020-2021 & 2021-22)
R18 / R21 REGULATION

III YEAR I SEM

S.No.	Course Code	Group	Course Title	L	T	P	Credits
1	21PC0CI01	PCC	Internet of Things	3	0	0	3
2	21ES0EC30	ES	Micro Controllers and Applications	3	0	0	3
3	21PC0CI02	PCC	Computer Networks	3	0	0	3
4	21HS0EN04	HSMC	Effective Technical Communication	3	0	0	3
5	21PE0CI1A	PEC	Professional Elective - I	3	0	0	3
6	21OE0DS01	OE	Open Elective - I	3	0	0	3
7	21ES0EC31	PCC	Micro Controllers and Applications Lab	0	0	3	1.5
8	21PC0CI03	PCC	Computer Networks Lab	0	0	3	1.5
9	21MC0CI01	MC	Environmental Science	3	0	0	0
6 Theory + 2 Lab + 1 MC			**Total Credits**	**21**	**0**	**6**	**21**

III Year II Semester

S.No.	Course Code	Group	Course Title	L	T	P	Credits
1	21PC0CI04	PCC	Internet of Things Architecture and Protocols	3	0	0	3
2	21PC0CI05	PCC	Mobile Application Development	3	0	0	3
3	21PC0IT06	PCC	Data Base Management Systems	3	0	0	3
4	21PE0C12A	PEC	Professional Elective - II	3	0	0	3
5	21PE0C13B	PEC	Professional Elective - III	3	0	0	3
6	21OE0CE3A	OE	Open Elective - II	3	0	0	3
7	21PC0IT09	PCC	Mobile Application Development Lab	0	0	3	1.5
8	21PC0CI06	PCC	Data Base Management Systems Lab	0	0	3	1.5
9	21MC0CS01	PCC	Fundamentals of Artificial Intelligence	3	0	0	0
7 Theory + 2 Lab			**Total Credits**	**21**	**0**	**6**	**21**

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

INTERNET OF THINGS

PRE-REQUISITE
A course on "Computer Networks"

COURSE OBJECTIVE
This course is introduced to describe the technologies, its applications with necessary protocols and working with python

SYLLABUS

UNIT - I
Introduction to Internet of Things: Introduction, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates.

UNIT - II
Domain Specific IoTs: Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health and Lifestyle.

UNIT - III
IoT and M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT.
IoT Platforms Design Methodology: Introduction, IoT Design Methodology, Case Study on IoT System for Weather Monitoring, Motivation for Using Python.

UNIT - IV
IoT Systems - Logical Design using Python: Introduction, Installing Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date/Time Operations, Classes, Python Packages of Interest for IoT.
IoT Physical Devices and Endpoints: What is an IoT Device, Exemplary Device: Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry Pi with Python, Other IoT Devices.

UNIT - V
IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models & Communication APIs, WAMP - AutoBahn for IoT, Xively Cloud for IoT, Python Web Application Framework - Django, Designing a RESTful Web API, Amazon Web Services for IoT, SkyNet IoT Messaging Platform.
Case Studies Illustrating IoT Design: Introduction, Home Automation, Cities, Environment, Agriculture, Productivity Applications.

TEXT BOOK

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015.

REFERENCE BOOK

1. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly.

COURSE OUTCOMES

By the end of the course, students will be able to

CO1: Interpret the impact and challenges posed by IoT networks leading to new architectural models.

CO2: Compare and contrast the deployment of smart objects and the technologies to connect them to network.

CO3: Appraise the role of IoT protocols for efficient network communication.

CO4: Elaborate the need for data analytics and security in IoT.

CO5: Illustrate different sensor technologies for sensing real world entities.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

III Year B. Tech. Sem-I

L	T	P	C
3	0	0	3

MICRO CONTROLLERS AND APPLICATIONS

PRE-REQUISITES

1. A course on "Computer Organization and Architecture"
2. A course on "Analog and Digital Electronics"

COURSE OBJECTIVE

This course is intended to make familiar with the architecture and the instruction set of an Intel microprocessor and Assembly language programming will be studied as well as the design of various types of digital and analog interfaces with understanding thearchitecture of Microcontrollers.

SYLLABUS

UNIT - I

Introduction to Microprocessor: 8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, interrupts of 8086.

Instruction Set and Assembly Language Programming of 8086: Instruction formats, addressing modes, Instruction Set and Simple Programs involving Logical, Branch and Call Instructions, Sorting, String Manipulations.

UNIT - II

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization, Addressing Modes and Instruction set of 8051.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters.

UNIT - III

I/O And Memory Interface: LCD, Keyboard, External Memory RAM, ROM Interface, ADC, DAC Interface to 8051.

Serial Communication and Bus Interface: Serial Communication Standards, Serial Data Transfer Scheme, On board Communication Interfaces-I2C Bus, SPI Bus, UART; External Communication Interfac11es-RS232, USB.

UNIT - IV

ARM Architecture: ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions, Software interrupt instructions, Program status register instructions, loading constants, Conditional execution, Introduction to Thumb instructions.

UNIT - V

Advanced ARM Processors: Introduction to CORTEX Processor and its architecture, OMAP Processor and its Architecture.

TEXT BOOKS

1. Douglas V Hall, Microprocessors Interfacing, Tata McGraw Hill, 1991.
2. Microcontrollers programming by Tularam M.Bansod Pratik Tawde.

REFERENCE BOOKS:

1. D A Patterson and J H Hennessy, "Computer Organization and Design The hardware and software interface. Morgan Kaufman Publishers.
2. Kenneth J. Ayala, The 8051 Microcontroller, Penram International Publishing, 1996.

COURSE OUTCOMES

By the end of the course, students will be able to:

CO 1: Understand microprocessor and micro controller architectures.
CO 2: Do assembly language programming.
CO 3: Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc.
CO 4: Develop systems using different microcontrollers.
CO 5: Understand RSIC processors and design ARM microcontroller-based systems.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

COMPUTER NETWORKS

PRE-REQUISITES

1. A course on "Computer Programming and Data Structures"
2. A course on "Design and Analysis of Algorithms"

COURSE OBJECTIVE

This course is intended to equip the students with an overview of the fundamental concepts of computer networks and the protocols of the various layers.

SYLLABUS

UNIT - I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: Internet, ARPANET. Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, Power lines, fiber optics. Wireless transmission: Electromagnetic spectrum, Radio transmission, Microwave transmission, Infrared transmission, and Light transmission.

UNIT - II

Data link layer: Design issues, framing, Error detection and correction: Hamming codes, Parity, Checksum, and Cyclic Redundancy Check. Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel. Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat.

Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols.

UNIT - III

Network Layer: Design issues, Routing algorithms: the optimality principle, shortest path algorithm, Flooding, distance vector routing, Hierarchical routing, Broadcast Routing, Multicast Routing. Congestion Control Algorithms, Quality of Service, Internetworking, the Network layer in the internet: IPv4 Protocol, IP Address, IPv6.

UNIT - IV

Transport Layer: Transport Service, Elements of Transport protocols: Addressing, Connection Establishment, Connection Release. Connection management. The Internet Transport Protocols: Introduction to UDP, Remote Procedure calls, Introduction to TCP, The TCP Service Model, The TCP Protocol, and The TCP Segment Header, The TCP Connection Establishment, TCP Connection Release.

UNIT - V

Application Layer - Domain name system: The DNS Name Space, Domain Resource Records,

Name Servers.

Electronic Mail: Architecture Services, SMTP, the World Wide Web: Architectural Overview, HTTP, Streaming audio and video: digital audio, digital video, streaming stored media, streaming live media, real time conferencing.

TEXT BOOK

1. Computer Networks, Andrew S Tanenbaum, David. Jj. Wetherall, 5th Edition, Pearson Education/PHI.

REFERENCE BOOKS

1. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, PearsonEducation
2. Data Communications and Networking, Behrouz A. Forouzan, 3rd Edition TMH.

COURSE OUTCOMES

By the end of the course, students will be able to:

CO 1: Describe the basic computer network technology.
CO 2: Express the functions of each layer in the OSI and TCP/IP reference model.
CO 3: Apply the skills of subnet and routing mechanisms.
CO 4: Examine the protocols of computer networks.
CO 5: Apply the concepts of computer networks in network design and implementation.

III Year B. Tech. I Sem **L T P C**
3 0 0 3

EFFECTIVE TECHNICAL COMMUNICATION

COURSE OBJECTIVES

The main objective of this course is to impart advance technical communication skills to students in terms of research, writing, editing, and design principles of technical and professional communication. Further, the course prepares students to design effective technical documentation such as Planning, drafting, revising, editing, researching, analyzing, synthesizing and applying information to create technical reports and professional documents through individual and collaborative writing to articulate complex ideas appropriate for target audiences. Moreover, the course inculcates business and professional ethics.

SYLLABUS

Module 1: Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media.

Module 2: Technical Writing, Grammar and Editing- Technical writing process, forms of discourse, Writing drafts and revising, Collaborative writing, creating indexes, technical writing style and language. Basics of grammar, study of advanced grammar, editing strategies to achieve appropriate technical style. Introduction to advanced technical communication, Usability, Human factors, Managing technical communication projects, time estimation, Single sourcing, Localization.

Module 3: Self Development and Assessment-Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. Managing Time; Personal memory, Rapid reading, Taking notes; Complex problem solving; Creativity

Module 4: Communication and Technical Writing- Public speaking, Group discussion, Oral; presentation, Interviews, Graphic presentation, Presentation aids, Personality Development. Writing reports, project proposals, brochures, newsletters, technical articles, manuals, official notes, business letters, memos, progress reports, minutes of meetings, event report.

Module 5: Ethics- Business ethics, Etiquettes in social and office settings, Email etiquettes, Telephone Etiquettes, Engineering ethics, Managing time, Role and responsibility of engineer, Work culture in jobs, Personal memory, Rapid reading, Taking notes, Complex problem solving, Creativity.

TEXT / REFERENCE BOOKS

1. David F. Beer, David McMurrey, Guide to writing as an Engineer, John Willey, New York, 2004
2. Diane Hacker, Pocket Style Manual, Bedford Publication, New York, 2003. (ISBN 0312406843)
3. Shiv Khera, You Can Win, Macmillan Books, New York, 2003.
4. Raman Sharma, Technical Communications, Oxford Publication, London, 2004.
5. Dale Jungk, Applied Writing for Technicians, McGraw Hill, New York, 2004. (ISBN: 07828357-4)
6. Sharma, R, Mohan, K, Business Correspondence and Report Writing, TMH New Delhi 2002.
7. Xebec, Presentation Book, TMH New Delhi, 2000. (ISBN 0402213)

COURSE OUTCOMES

At the end the course students will be able to:

CO1: Understand the ethical, international, social, and professional constraints of audience, style, and content for writing situations and communicate effectively.

a) among managers or co-workers and colleagues of an organization
b) between organizations, or between an organization and the public

CO2: Understand professional writing by studying management communication contexts and genres, researching contemporary business topics, analyzing quantifiable data discovered by researching, and constructing finished professional workplace documents.

CO3: Practice the unique qualities of professional rhetoric and writing style, such as sentence conciseness, clarity, accuracy, honesty, avoiding wordiness or ambiguity, using direct order organization, readability, coherence and transitional devices and to present technical material orally with confidence and poise.

CO4: Develop employability skills like time management, values and beliefs, self-esteem, perception and attitude, problem-solving skills and creativity.

III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

PRINCIPLES OF SOFTWARE DEVELOPMENT

COURSE OBJECTIVE

This course aims to analyze various software process models such as waterfall and evolutionary models, different software architectural styles and software testing approaches

SYLLABUS

UNIT - I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process.

UNIT - II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

System models: Context models, behavioral models, data models, object models, structured methods.

UNIT - III

Design Engineering: Design process and design quality, design concepts, the design model.

Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

UNIT - IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging.

Product metrics: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance.

UNIT - V

Metrics for Process and Products: Software measurement, metrics for software quality.

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

TEXT BOOKS

1. Software Engineering, A practitioner's Approach, Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering, Sommerville, 7th edition, Pearson Education.
3. The Unified Modeling Language User Guide, Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCE BOOKS

1. Software Engineering, An Engineering approach, James F. Peters, Witold Pedrycz, John Wiely.
2. Software Engineering Principles and Practice, Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object oriented design using UML, Meiler Page, Jones, Pearson Education.

COURSE OUTCOMES

By the end of the course, students will be able to:

CO 1: Apply the principles and techniques of software engineering and develop a business plan for a start-up software business.

CO 2: Prepare technical documentations and make presentations on various aspects of a software development.

CO 3: Employ software testing and quality assurance techniques at the module level

CO 4: Evaluate the assumptions and arguments for improving the quality of the software and reducing the risk factors.

CO 5: Develop and maintain efficient, reliable and cost-effective software solutions.

III Year B.Tech. Sem-I

L	T	P	C
3	0	0	3

DATA SCIENCE WITH PYTHON PROGRAMMING

PRE-REQUISITES
A Course on "Programming for Problem Solving"

COURSE OBJECTIVES
The aim of the course is to learn the features of numpy and pandas in the data science.

SYLLABUS

UNIT - I

Introduction: What Kinds of Data?, Why Python for Data Analysis?, Essential Python Libraries
Python Language Basics, IPython, and Jupyter Notebooks: The Python Interpreter, IPython Basics, Python Language Basics
Built-in Data Structures, Functions, and Files: Data Structures and Sequences, Functions, Files and the Operating System

UNIT - II

NumPy Basics: Arrays and Vectorized Computation: The NumPy ndarray: A Multidimensional Array Object, Universal Functions: Fast Element-Wise Array Functions, Array-Oriented Programming with Arrays, File Input and Output with Arrays, Linear Algebra, Pseudorandom Number Generation
Advanced NumPy: ndarray Object Internals, Advanced Array Manipulation, Broadcasting, Structured and Record Arrays, More About Sorting Writing Fast NumPy Functions with Numba, Advanced Array Input and Output, Performance Tips

UNIT - III

Getting Started with pandas: Introduction to pandas Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics
Advanced pandas: Categorical Data, Advanced GroupBy Use, Techniques for Method Chaining
Introduction to Modeling Libraries in Python: Interfacing Between pandas and Model Code, Creating Model Descriptions with, Introduction to statsmodels, Introduction to scikit-learn

UNIT - IV

Data Loading, Storage, and File Formats: Reading and Writing Data in Text Format, Binary Data Formats, Interacting with Web APIs, Interacting with Databases
Data Cleaning and Preparation: Handling Missing Data, Data Transformation, String Manipulation
Data Wrangling: Join, Combine, and Reshape: Hierarchical Indexing,Combining and Merging Datasets, Reshaping and Pivoting

UNIT - V

Plotting and Visualization: A Brief matplotlib API Primer, Plotting with pandas and seaborn, Other Python Visualization Tools

Data Aggregation and Group Operations: GroupBy Mechanics, Data Aggregation, Apply: General split-apply-combine, Pivot Tables and Cross-Tabulation

Time Series: Date and Time Data Types and Tools, Time Series Basics,Date Ranges, Frequencies, and Shifting, Time Zone Handling, Periods and Period Arithmetic, Resampling and Frequency Conversion, Moving Window Functions

TEXTBOOKS

1. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition, 2018.
2. Y. Daniel Liang, "Introduction to Programming using Python", Pearson, 2012.
3. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly, 2017.

REFERENCE BOOKS

1. Wesley J. Chun, "Core Python Programming", Prentice Hall,2006.
2. Mark Lutz, "Learning Python", O'Reilly, 4th Edition, 2009.

Course Outcomes

Upon completion of this course, the students will be able to:

CO1: Identify the need for data science and solve basic problems using Python built-in data types and their methods.

CO2: Design an application with user-defined modules and packages using OOP concept.

CO3: Employ efficient storage and data operations using NumPy arrays.

CO4: Apply powerful data manipulations using Pandas.

CO5: Do data preprocessing and visualization using Pandas.

GURUNANAKINSTITUTIONSTECHNICACAMS
(AUTONOMOUS)

III Year B.Tech. Sem-I

L	T	P	C
0	0	3	1.5

MICRO CONTROLLERS AND APPLICATIONS LABORATORY

CO-REQUISITE
A Course on "Sensor and Devices"

COURSE OBJECTIVE
This lab course is introduced to have a hands-on experience with the architecture and the instruction set of an Intel microprocessor

SYLLABUS
LIST OF EXPERIMENTS

1. 8086 Arithmetic Operations (Addition, Subtraction, multiplication and division)
2. Ascending order/descending order of an array of numbers.
3. Stepper motor interfacing to 8086.
4. 8051 Arithmetic Operations (Addition, Subtraction, multiplication and division)
5. Implementation of Timers and Counters using 8051.
6. Interrupt handling in 8051.
7. UART operation in8051.
8. LCD interfacing to 8051
9. I/O control of robot (ROBOTICS)
10. Speed control of robot (ROBOTICS)
11. Obstacle detection for robots (ROBOTICS)
12. Appliance control using robot (ROBOTICS)
13. Arduino controller based LED interfacing (IOT)
14. Arduino controller based relay switching (IOT)
15. Arduino controller based switch interfacing (IOT)

TEXT BOOKS

1. Douglas V Hall, Microprocessors Interfacing, Tata McGraw Hill, 1991.
2. Microcontrollers programming by TularamM.Bansod Pratik Tawde.

REFERENCE BOOKS

1. D A Patterson and J H Hennessy, "Computer Organization and Design The hardware andsoftware interface, Morgan Kaufman Publishers.
2. Kenneth J. Ayala, The 8051 Microcontroller, Penram International Publishing, 1996.

COURSE OUTCOMES

At the end of this course students will demonstrate the ability to

CO1: Do assembly language programming.
CO2: Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc.
CO3: Develop systems using different microcontrollers.
CO4: Understand RSIC processors and design ARM microcontroller-based systems.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS

(AUTONOMOUS)

III Year B.Tech. Sem-I

L	T	P	C
0	0	3	1.5

COMPUTER NETWORKS LAB

CO-REQUISITE

A course on "Computer Networks".

COURSE OBJECTIVE

This lab course is intended to provide practical exposure of the concepts, designing, modeling and evaluation in computer networks.

LIST OF PROGRAMS

1. Implement the data link layer framing method "character-stuffing"
2. Implement the data link layer framing method "bit stuffing"
3. Write a program to compute CRC code for the polynomial "CRC-12"
4. Write a program to compute CRC code for the polynomial "CRC-16"
5. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism
6. Implement Dijkstra's algorithm to compute the shortest path through a network
7. Write a program to implement congestion control in network layer using leaky bucket algorithm
8. Take an example subnet of hosts and obtain a broadcast tree for the subnet
9. Implement distance vector routing algorithm for obtaining routing tables at each node

TEXT BOOK

1. Computer Networks, Andrew S Tanenbaum, David. J. Wetherall, 5th Edition, Pearson Education.

REFERENCE BOOKS

1. An Engineering Approach to Computer Networks, S.Keshav, 2nd Edition, Pearson Education.
2. Data Communications and Networking, Behrouz A. Forouzan, Third Edition TMH.

COURSE OUTCOMES

Upon successful completion of this Lab, students will be able to:

CO 1: Describe data link layer framing methods.

CO 2: Classify error correction and detection techniques and design data link layer protocols.

CO 3: Employ routing and congestion algorithms and also generate encryption algorithms.

CO 4: Test the network scenario.

CO 5: Study the performance of computer networks and protocols.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

III Year B.Tech. I Sem

L	T	P	C
3	0	0	0

ENVIRONMENTAL SCIENCE

COURSE OBJECTIVES

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations.

SYLLABUS

UNIT - I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT - III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards,

Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary, and Tertiary. Overview of air pollution control technologies;

Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT V

Environmental Policy, Legislation & EIA: 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 and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS Publications.

COURSE OUTCOMES

Based on this course, the Engineering graduate will understand /evaluate/develop technologies on the basis of ecological principles and environmental regulations which in turn help in sustainable development.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
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III Year B.Tech. II Sem

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INTERNET OF THINGS ARCHITECTURE AND PROTOCOLS

PRE-REQUISITES
A course on Sensors and Devices.

COURSE OBJECTIVES
This course aims to understand the Architectural Overview of IoT, the IoT Reference Architecture and Real-World Design Constraints and the various IoT Protocols (Datalink, Network, Transport, Session, Service)

SYLLABUS

UNIT - I
IoT-An Architectural Overview-Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management.

UNIT - II
REFERENCE ARCHITECTURE
IoT Architecture-State of the Art - Introduction, State ofthe art, Reference Model an architecture, IoT reference Model - IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT - III
IoT PROTOCOLS- IoT Access Technologies
Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks,6LoWPAN, Application Transport Methods: SCADA, Application Layer Protocols: CoAP and MQTT.

UNIT - IV
IP as the IoT Network Layer
The Business Case for IP, The Need for Optimization, Optimizing IP for IoT, Profiles and Compliances.

UNIT - V
Application Protocols for IoT
The Transport Layer, IoT Application Transport Methods, SCADA, Background on SCADA, Adapting SCADA for IP, Tunneling Legacy SCADA over IPNetworks, SCADA Protocol Translation, SCADA Transport over LLNs with MAP-T, Generic Web-Based Protocols, IoT Application Layer Protocols, CoAP, Message Queuing Telemetry Transport (MQTT).
Health data analytics using Internet of things: Introduction, methods used for health IoTDA, bottlenecks of the health IoTDA.

TEXT BOOKS

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
2. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and JeromeHenry, Cisco Press, 2017

REFERENCE BOOKS

1. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications Bernd Scholz-Reiter, Florian
2. Michahelles, "Architecting the Internet of Things", ISBN 978-3- 642-19156-5 e-ISBN978-3- 642-19157-2, Springer
3. Hakima Chaouchi, " The Internet of Things Connecting Objects to the Web" ISBN : 978-1-84821-140-7, Willy Publications
4. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols, ISBN: 978-1-119-99435-0, 2 nd Edition, Willy Publications

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO 1: Understand the building an architecture, and M2M and IoT technology
CO 2: Understand Real world designs
CO 3: Understand the access technologies of IoT
CO 4: Understand internet protocols as network layer
CO 5: Understand application protocols of IoT

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MOBILE APPLICATION DEVELOPMENT

PRE-REQUISITES

1. A course on "Computer Programming"
2. A course on "Data Structures"

COURSE OBJECTIVES

On completion of this course the students should be able to working of Android OS, develop Android user interfaces and develop, deploy and maintain the Android Applications.

SYLLABUS

UNIT - I

Introduction to Android Operating System

Android OS and Features - Android development framework; Installing and running applications on Android Studio, Creating AVDs, Types of Android application; Creating Activities, Activity Life Cycle, Activity states, monitoring state changes.

UNIT - II

Android application components

Android Manifest file, Externalizing recourses like Simple Values, Drawables, Layouts, Menus, etc, Building User Interfaces: Fundamental Android UI design, Layouts - Linear, Relative, Grid and Table Layouts. User Interface (UI) Components.

UNIT - III

Fragments

Creating fragments, Lifecycle of fragments, Fragment states, adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities**.**

UNIT - IV

Intents and Broadcasts

Using intents to launch Activities, Types of Intents, Passing data to Intents, Getting results from Activities, Broadcast Receivers - Using Intent filters to service implicit Intents, Resolving Intent filters.

UNIT V

Database

Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data.

TEXT BOOKS

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCE BOOKS

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013
2. Android Application Development (with Kitkat Support), Black Book, Pradeep Kothari, 2014, Dreamtech Press publisher, Kogent Learning Inc.,2014
3. Android Programming: Pushing the Limits, Erik Hellman, 1st Edition,Wiley Publications, 2014

COURSE OUTCOMES

By the end of the course, students will be able to:

CO 1: Ability to evaluate and select appropriate solutions to the mobile computing platform.

CO 2: Apply suitable software tools and APIs for the development User Interface of a particular mobile application.

CO 3: Apply intents and broadcast receivers in android application.

CO 4: Ability to design a simple mobile phone game.

CO 5: Develop and design apps for mobile devices using SQLite Database.

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DATA BASE MANAGEMENT SYSTEMS

PRE-REQUISITES
A course on Data Structures.

COURSE OBJECTIVES
This course is introduced to describe the basic concepts of SQL, build queries using SQL commands and generate applications of database systems.

SYLLABUS

UNIT - I

Database System Applications: Database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational mode. database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, history of data base systems, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model.

UNIT - II

Introduction to the Relational Model: Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views, form of basic SQL query, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity's, AND, OR and NOT, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases.

UNIT - III

Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus.

Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT - IV

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation-Based Protocols, Multiple Granularity. Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with loss of nonvolatile storage, ARIES Recovery, Remote Backup systems.

UNIT - V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File

Organizations, Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition.
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

REFERENCE BOOKS

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, Pearson Education.
3. Introduction to Database Systems, C.J.Date, Pearson Education.
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

COURSE OUTCOMES

By the end of the course, students will be able to:

CO1: Describe the basic fundamentals of DBMS and database design.
CO2: Identify the appropriate SQL commands for retrieval and management of data.
CO3: Analyze the schema refinement and normal forms.
CO4: Identify data models for relevant problems.
CO5: Model database storage structures and access techniques.

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MACHINE LEARNING

PRE-REQUISTES
A course on “Data Structure”.

COURSE OBJECTIVES
This course is intended to learn the basic concepts and techniques of machine learning understand supervised and unsupervised learning techniques and to study the various probabilities based learning techniques along with graphical models of machine learning algorithms.

SYLLABUS

UNIT I
Introduction: Learning - Types of machine learning - Supervised Learning - The Brain and the neuron - Design a Learning System-Perspectives and Issues in Machine Learning - Concept Learning Task-Concept Learning as Search - Finding a Maximally Specific Hypothesis - Version Spaces and the Candidate Elimination Algorithm - Linear Discriminates - Perceptron - Linear Separability - Linear Regression.

UNIT II
Linear Models: Multi-layer Perceptron - Going Forward - Going Backwards: Back Propagation Error - Multi-Layer Perceptron in Practice - Examples of using the MLP - Overview - Deriving Back - Radial Basis Functions and Splines - Concepts - RBF Network - Curse of Dimensionality - Interpolations and Basis Functions - Support Vector Machines.

UNIT III
Tree and Probabilistic Models: Learning with trees - Decision Tress - Constructing Decision Tress - Classification and Regression Trees - Ensemble Learning - Boosting - Bagging - Different ways to combine Classifiers - Probability and Learning - Data into Probabilities - Basic Statistics - Gaussian Mixture Models - Nearest Neighbor Methods - Unsupervised Learning - K means Algorithms - Vector Quantization - Self Organizing Feature Map.

UNIT IV
Dimensionality Reduction and Evolutionary Models: Dimensionality Reduction - Linear Discriminate Analysis - Principal Component Analysis - Factor Analysis - Independent Component Analysis - Locally Linear Embedding - Isomap - Least Squares Optimization - Evolutionary Learning - Genetic algorithms. Offspring - Genetic Operators - Using Genetic algorithms - Reinforcement Learning - Overview - Getting Lost Example - Markov Decision Process.

UNIT V
Graphical Models: Markov Chain Monte Carlo Methods - Sampling - Proposal Distribution - Markov Chain Monte Carlo - Graphical Models - Bayesian Networks - Markov Random Fields - Hidden Markov Models - Tracking Methods.

TEXT BOOKS

1. Stephen Marsland “Machine Learning - An Algorithmic Perspective”, Second Edition, Chapman and Hall CRC Machine Learning and Pattern Recognition Series.2014.
2. Tom M Mitchell, “Machine Learning”, First Edition, McGraw Hill Education 2013.

REFERENCE BOOKS

1. Peter Flach, “Machine Learning: The art and Science of Algorithms that Make Sense of Data”, First Edition, Cambridge University Press, 2012.
2. Jason Bell, “Machine Learning - Hands on for Developers and Technical Professionals”, First Edition, Wiley, 2014.
3. Ethem Alpaydin, “Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)”, Third Edition, MIT Press, 2014.

COURSE OUTCOMES

After completion of the course, students should be able to:

CO1: Distinguish supervised, Unsupervised and semi-supervised learning.
CO2: Apply appropriate machine learning strategy for any given problems.
CO3: Describe probabilistic models for classification and regression.
CO4: Apply evolutionary models to improve classification efficiency.
CO5: Design systems that use the appropriate graphical models of machine learning.

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CRYPTOGRAPHY AND NETWORKS SECURITY

PRE-REQUISTES
A course on "Computer Networks".

COURSE OBJECTIVES
This course is intended to impart knowledge on network security issues, services, goals and mechanisms and security of communication systems, networks and protocols.

SYLLABUS
UNIT I
Security Attacks: (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT II
Conventional Encryption: Principles, Conventional encryption algorithms (DES, AES, RC4, and Blowfish), cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT III
Number Theory: Modular Arithmetic, Euclid's Algorithm, Fermat's and Euler's Theorem, Chinese Remainder Theorem, Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

UNIT IV
Email privacy: Pretty Good Privacy (PGP) and S/MIME.
IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT V
Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).
Intruders, Viruses and related threats, Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS
1. "Cryptography and Network Security", William Stallings, 3rd Edition, PearsonEducation.
2. "Applied Cryptography", Bruce Schneier.

REFERENCE BOOKS

1. Cryptography and Network Security, Behrouz A.Forouzan

COURSE OUTCOMES

By the end of the course, students will be able to:

CO1: Define cryptography and network security concepts.
CO2: Explain security principles in system design.
CO3: Choose and investigate vulnerabilities, security threats, and mechanisms to counter them.
CO4: Understand various E-Mail Security issues.
CO5: Understand various types of viruses and threats on web.

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REMOTE SENSING & GIS
(OPEN ELECTIVE - II)

COURSE OBJECTIVE

The objectives of the course are to know the concepts of Remote Sensing, its interpreting Techniques and concepts of Digital images, know the concept of Geographical Information System (GIS), coordinate system GIS Data and its types understand the students managing the spatial Data Using GIS and understand implementation of GIS interface for practical usage.

SYLLABUS

UNIT I

Concepts of Remote Sensing: Basics of remote sensing- elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology - units, energy resources, energy interactions with earth surface features & atmosphere, atmospheric effects, satellite orbits, Sensor Resolution, types of sensors. Remote Sensing Platforms and Sensors, IRS satellites.

Remote Sensing Data Interpretation Visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of soil, water and vegetation. Concepts of Digital image processing, image enhancements, qualitative & quantitative analysis and pattern recognition, classification techniques and accuracy estimation.

UNIT II

Introduction to GIS: Introduction, History of GIS, GIS Components, GIS Applications in Real life, The Nature of geographic data, Maps, Types of maps, Map scale, Types of scale, Map and Globe, Co-ordinate systems, Map projections, Map transformation, Geo-referencing.

UNIT III

Spatial Database Management System: Introduction: Spatial DBMS, Data storage, Database structure models, database management system, entity-relationship model, normalization. Data models and data structures: Introduction, GIS Data model, vector data structure, raster data structure, attributes data, geo-database and metadata.

UNIT IV

Spatial Data input and editing: Data input methods - keyboard entry, digitization, scanning, conversion of existing data, remotely sensed data, errors in data input, Data accuracy, Micro and Macro components of accuracy, sources of error in GIS.

Spatial Analysis: Introduction, topology, spatial analysis, vector data analysis, Network analysis, raster data analysis, Spatial data interpolation techniques.

UNIT V

Implementing a GIS: Awareness, developing system requirements, evaluation of alternative systems, decision-making using GIS. Applications of GIS: GIS based road network planning, Mineral mapping using GIS, Shortest path detection using GIS, Hazard Zonation using remote sensing and GIS, GIS for solving multi criteria problems, GIS for business applications.

TEXT BOOKS

1. Remote Sensing and GIS, Basudeb Bhatta, Oxford University Press, 2nd Edition, 2011.
2. Introduction to Geographic Information Systems, Kang-Tsung Chang, Mc Graw Hill Education (Indian Edition), 7th Edition, 2015.
3. Fundamentals of Geographic Information Systems, Michael N. Demers, 4th Edition, Wiley Publishers, 2012.

REFERENCE BOOKS

1. Remote Sensing and Image Interpretation, Thomas M. Lilles, Ralph W. Kiefer, Wiley Publishers, 7th Edition, 2015.
2. Geographic Information systems - An Introduction, Tor Bernhardsen, Wiley India Publication, 3rd Edition, 2010.
3. Advanced Surveying: Total Station, GIS and Remote Sensing, Satheesh Gopi, R. Sathikumar, N.Madhu, Pearson Education, 1st Edition, 2007.
4. Textbook of Remote Sensing and Geographical Information systems, M.Anji Reddy, BS Publications.

COURSE OUTCOMES

On successful completion of this course, it is expected that the students will be able to:

CO1: Describe different concepts and terms used in Remote Sensing and its data.
CO2: Understand the Data conversion and Process in different coordinate systems of GIS Interface.
CO3: Understand spatial database management system.
CO4: Evaluate the accuracy of Data and implementing a GIS.
CO5: Understand the applicability of RS and GIS for various applications.

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DATA BASE MANAGEMENT SYSTEMS LAB

PRE-REQUISITES
A course on Data Base Management Systems.

COURSE OBJECTIVES
This lab course is intended to describe the SQL basics for data definition, data manipulation and introduce ER data model, database design and normalization.

SOFTWARE REQUIREMENTS
Oracle / MySql

LIST OF TASKS
1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

TEXT BOOKS

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition.
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, 5th Edition.

REFERENCE BOOKS

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education.
3. Introduction to Database Systems, C.J.Date, Pearson Education.
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.

COURSE OUTCOMES
Upon successful completion of this lab, students will be able to:

CO1: Design the ER diagram.

CO2: Analyzing the business requirements and producing a viable model for the implementation of

the database.
CO3: Converting the entity-relationship diagrams into relational tables.
CO4: Develop appropriate databases to a given problem that integrates ethical, social, legal, and economic concerns.
CO5: Implement queries using SQL commands.

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MOBILE APPLICATION DEVELOPMENT LAB

PRE-REQUISITES

1. A course on "Computer Programming"
2. A course on "Data Structures"

COURSE OBJECTIVES

This lab course is intended to provide practical exposure of the how to develop Applications inandroid environment, develop user interface applications, develop URL related applications.

List of Experiments

1. Installation of Android studio.
2. Development of Hello World Application
3. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button.
4. Create a screen that has input boxes for User Name, Password, Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout)
5. Design an android application to create page using Intent and one Button and pass the Values from one activity to second activity.
6. Design an android application Send SMS using Intent.
7. Create an android application using Fragments.
8. Design an android application Using Radio buttons.
9. Design an android application for menu.
10. Create a user registration application that stores the user details in a database table.

TEXT BOOKS

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

REFERENCE BOOKS

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013
2. Android Application Development (with Kitkat Support), Black Book, Pradeep Kothari, 2014, Dreamtech Press publisher, Kogent Learning Inc.,2014
3. Android Programming: Pushing the Limits, Erik Hellman, 1st Edition, Wiley Publications, 2014

COURSE OUTCOMES

By the end of the course, students will be able to:

CO 1: Ability to evaluate and select appropriate solutions to the mobile computing platform.

CO 2: Apply suitable software tools and APIs for the development user interface of a particular mobile application.

CO 3: Apply intents and broadcast receivers in android application.

CO 4: Ability to design a simple mobile phone game.

CO 5: Develop and design apps for mobile devices using SQLite Database.

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FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

COURSE OBJECTIVES

The course is introduced to familiarize the basic concepts of artificial intelligence, its relevance in the modern era and various applications

SYLLABUS

UNIT- I

Introduction: What is artificial intelligence, foundations of artificial intelligence, history of artificial intelligence

Intelligent Agents: Agents and environments, the structure, good behavior: the concept of rationality, the nature of environments, the structure of agents, applications of AI.

UNIT - II

Solving Problem by Searching: Problem solving agents, example problems, searching for solutions.

Uninformed Search Strategies: Breadth first search, uniform-cost search, depth first search, depth limited search, iterative deepening search, bidirectional search, comparing uninformed search strategies.

UNIT - III

Logical Agents: Knowledge-based agents, the wumpus world, logic, propositional logic: the very simple logic.

Knowledge Representation: Introduction, approaches to knowledge representation-relational knowledge, knowledge represented as logic, procedural knowledge, knowledge representation using semantic networks, inheritance in semantic net.

UNIT - IV

Expert System & Applications: Introduction, phases in building expert systems-knowledge engineering, knowledge representation, expert systems architecture-knowledgebase, inference engine, knowledge acquisition, expert systems versus traditional systems-characteristics of expert systems, evolution of expert systems, advantages and disadvantages of expert systems, languages for expert system development., applications of expert systems.

UNIT - V

Machine Learning Paradigm: Introduction, machine learning system-components of learning system, rote learning, learning by taking advice.

Supervised & Unsupervised Learning: Supervised concept learning, unsupervised concept learning, reinforcement learning.

TEXT BOOKS

1. Artificial Intelligence - A Modern Approach, 3rd Edition, Stuart J. Russell, Peter Norvig, Pearson Education.
2. Artificial Intelligence, Saroj Kaushik, Cengage Publication.

REFERENCE BOOKS

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivashankar B. Nair, 3rd Edition, McGraw Hill.
2. Principles of Artificial Intelligence, Nils J. Nilson, Morgan Kaufmann Publishers.
3. Artificial Intelligence, 3rd Edition, Patric Henry Winston, Pearson Education.
4. Artificial Intelligence Illuminated, Ben Coppin, Narosa Publication.

COURSE OUTCOMES

By the end of the course, students will be able to

CO 1: Identify the importance of artificial intelligence
CO 2: Apply various search strategies to provide efficient solutions for problem space
CO 3: Comprehend various approaches for knowledge representation
CO 4: Employ expert systems for knowledge engineering applications
CO 5: Develop models using machine learning techniques