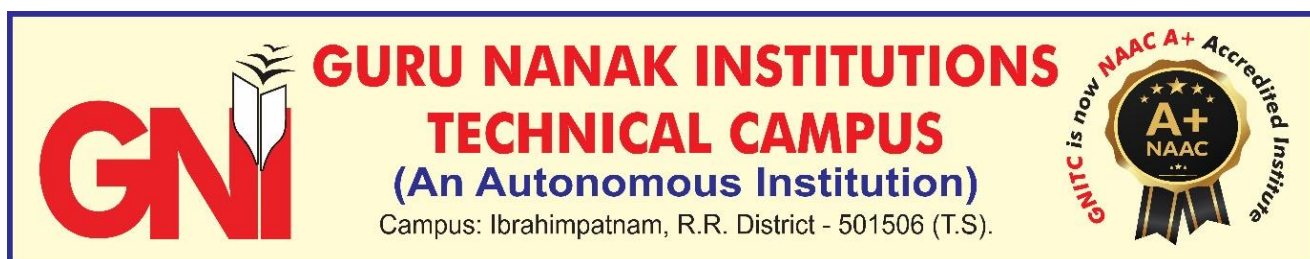**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

GNITC –SPECIAL BATCH (Regulation -R22)

COURSE STRUCTURE

&

DETAILED SYLLABUS

III B. Tech I Semester
(Applicable for the batches admitted from 2022-23)

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

Vision

To become a premier Computer Science and Engineering department by imparting high quality education, ethical values, provide creative environment for innovation and global opportunities.

Mission

- **M1:** Nurture young individuals into knowledgeable, skillful and ethical professionals in their pursuit of Computer Science & Engineering.
- **M2:** Foster the students through excellent teaching learning process and sustain high performance through innovation.
- **M3:** Provide high quality soft skills and advanced industry specific technical trainings to meet global career opportunities.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- **PEO 1:** Graduates shall have the ability to apply knowledge across the disciplines and in emerging areas of Computer Science and Engineering for higher studies, research, employability, product development and handle the realistic problems.
- **PEO 2:** Graduates shall have the ability to apply knowledge across the disciplines and in emerging areas of Computer Science and Engineering for higher studies, research, employability, product development and handle the realistic problems.
- **PEO 3:** Graduates shall possess academic excellence with innovative insight, managerial skills, leadership qualities, knowledge of contemporary issues and understand the need for lifelong learning for a successful professional career.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

- **PO 1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO 2:** Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO 3:** Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO 4:** Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO 5:** Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO 6:** The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO 7:** Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO 8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO 9:** Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO 10:** Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO 11:** Project Management and Finance: Demonstrate knowledge and understanding of the engineering 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.
- **PO 12:** Life-long Learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

- **PSO 1:** Ability to apply software technical skills to design, develop and debug optimized solutions for all real world problems.
- **PSO 2:** Ascertain knowledge in diverse areas of Computer Science and experience an environment conducive in novel skills for successful career, entrepreneurship and higher studies.

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

COURSE STRUCTURE
(Applicable for the Batch admitted from 2022-2023)

R22 REGULATION

III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	22PC0CS13	Design and Analysis of Algorithms	3	1	0	4
2	22PC0CS14	Computer Networks	3	0	0	3
3	22PC0CS15	DevOps	3	0	0	3
4		Professional Elective-I	3	0	0	3
5		Professional Elective -II	3	0	0	3
6	22PC0CS16	Computer Networks Lab	0	0	2	1
7	22PC0CS17	DevOps Lab	0	0	2	1
8	22HS0EN03	Advanced English Communication Skills Lab	0	0	2	1
9	22SD0CS03	UI design- Flutter	0	0	2	1
10	22MC0MB03	Intellectual Property Rights	3	0	0	0
		Total	**18**	**1**	**8**	**20**

III YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	22PC0CS18	Machine Learning	3	0	0	3
2	22PC0CS19	Formal Languages and Automata Theory	3	0	0	3
3	22PC0CS20	Artificial Intelligence	3	0	0	3
4		Professional Elective – III	3	0	0	3
5		Open Elective-I	3	0	0	3
6	22PC0CS21	Machine Learning Lab	0	0	2	1
7	22PC0CS22	Artificial Intelligence Laboratory	0	0	2	1
8		Professional Elective-III Lab	0	0	2	1
9	22PR0CS02/ 22SD0CS04	Industrial Oriented Mini Project/ Internship/ Skill Development Course (Big data-Spark)	0	0	4	2
10	22MC0CH03	Environmental Science	3	0	0	0
		Total	**18**	**0**	**10**	**20**

COURSE STRUCTURE

(Applicable for the Batch admitted from 2022-23)

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	22PC0CS23	Cryptography and Network Security	3	0	0	3
2	22PC0CS24	Compiler Design	3	0	0	3
3		Professional Elective -IV	3	0	0	3
4		Professional Elective -V	3	0	0	3
5		Open Elective - II	3	0	0	3
6	22PC0CS25	Cryptography and Network Security Lab	0	0	2	1
7	22PC0CS26	Compiler Design Lab	0	0	2	1
8	22PR0CS03	Project Stage - I	0	0	6	3
		Total Credits	**15**	**0**	**10**	**20**

IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	22SS0MB17	Organizational Behavior	3	0	0	3
2		Professional Elective – VI	3	0	0	3
3		Open Elective – III	3	0	0	3
4	22PR0CS04	Project Stage – II including Seminar	0	0	22	11
		Total Credits	**9**	**0**	**22**	**20**

List of professional Electives

Professional Elective - I

22PE0CS01	Quantum Computing
22PE0CS02	Advanced Computer Architecture
22PE0CS03	Data Analytics
22PE0CS04	Image Processing
22PE0CS05	Principles of Programming Languages

Professional Elective – II

22PE0CS06	Computer Graphics
22PE0CS07	Embedded Systems
22PE0CS08	Information Retrieval Systems
22PE0CS09	Distributed Databases
22PE0CS10	Natural Language Processing

Professional Elective – III

22PE0CS11	Full Stack Development
22PE0CS12	Internet of Things
22PE0CS13	Scripting Languages
22PE0CS14	Mobile Application Development
22PE0CS15	Software Testing Methodologies

Professional Elective – III Labs

22PE0CS16	Full Stack Development Lab
22PE0CS17	Internet of Things Lab
22PE0CS18	Scripting Languages Lab
22PE0CS19	Mobile Application Development Lab
22PE0CS20	Software Testing Methodologies Lab

Professional Elective –IV

22PE0CS21	Graph Theory
22PE0CS22	Cyber Security
22PE0CS23	Soft Computing
22PE0CS24	Cloud Computing
22PE0CS25	Ad hoc & Sensor Networks

Professional Elective –V

22PE0CS26	Advanced Algorithms
22PE0CS27	Agile Methodology
22PE0CS28	Robotic Process Automation
22PE0CS29	Blockchain Technology
22PE0CS30	Software Process & Project Management

Professional Elective – VI

22PE0CS31	Computational Complexity
22PE0CS32	Distributed Systems
22PE0CS33	Deep Learning
22PE0CS34	Human Computer Interaction
22PE0CS35	Cyber Forensics

DESIGN AND ANALYSIS OF ALGORITHMS (22PC0CS13)

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

                                                                                                  3 1 0 4

Prerequisites:

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

Course Objectives:

- Introduces the notations for analysis of the performance of algorithms and the data structure ofdisjoint sets.
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate
- Describes how to evaluate and compare different algorithms using worst-, average-, and bestcase analysis.
- Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

Course Outcomes:

- Analyze the performance of algorithms
- Choose appropriate data structures and algorithm design methods for a specified application
- Understand the choice of data structures and the algorithm design methods

UNIT - I

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, AsymptoticNotations- Big oh notation, Omega notation, Theta notation and Little oh notation.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT - II

Disjoint Sets: Disjoint set operations, union and find algorithms, Priority Queue- Heaps, Heapsort

Backtracking: General method, applications, n-queen's problem, sum of subsets problem, graph Coloring, hamitonian cycles.

UNIT - III

Dynamic Programming: General method, applications- Optimal binary search tree, 0/1 knapsackproblem, All pairs shortest path problem, Traveling salesperson problem, Reliability design.

UNIT - IV

Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem,Minimum cost spanning trees, Single source shortest path problem.

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs,Connected components, Biconnected components.

UNIT - V

Branch and Bound: General method, applications - Traveling salesperson problem, 0/1 knapsackproblem - LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP-Hard andNP-Complete classes, Cook's theorem.

TEXT BOOK:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan,University press, 1998.

REFERENCE BOOKS:

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R.Tamassia, John Wiley and sons.

COMPUTER NETWORKS (22PC0CS14)

3 0 0 3

Prerequisites

1. A course on "Programming for problem solving"
2. A course on "Data Structures"

Course Objectives

- The objective of the course is to equip the students with a general overview of the conceptsand fundamentals of computer networks.
- Familiarize the students with the standard models for the layered approach to communicationbetween machines in a network and the protocols of the various layers.

Course Outcomes

- Gain the knowledge of the basic computer network technology.
- Gain the knowledge of the functions of each layer in the OSI and TCP/IP reference model.
- Obtain the skills of subnetting and routing mechanisms.
- Familiarity with the essential protocols of computer networks, and how they can be applied innetwork design and implementation.

UNIT - I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET,Internet.

Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, WirelessTransmission.

Data link layer: Design issues, framing, Error detection and correction.

UNIT - II

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-freechannel, 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 protocolusing Selective Repeat, Example data link protocols.

Medium Access sublayer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT - III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT - IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT - V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streamingaudio and video.

TEXT BOOK:

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. PearsonEducation/PHI

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.

DEVOPS (22PC0CS15)

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

                                                                3   0   0   3

Pre-Requisites:

1. Software Engineering
2. Software Project Management

Course Objectives:

- Understand the skill sets and high-functioning teams involved in Agile, DevOps and relatedmethods to reach a continuous delivery capability.
- Implement automated system update and DevOps lifecycle.

Course Outcomes:

- Understand the various components of DevOps environment.
- Identify Software development models and architectures of DevOps
- Use different project management and integration tools.
- Select an appropriate testing tool and deployment model for project.

UNIT-I
Introduction to DevOps:

Introduction, Agile development model, DevOps and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, identifying bottlenecks.

UNIT-II
Software development models and DevOps:

DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing. DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, The separation of concerns, Handling database migrations, Micro services and the data tier, DevOps, architecture, and resilience.

UNIT-III
Introduction to project management:

The need for source code control, the history of source code management, Roles and code, source code management system and migrations, shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

UNIT-IV
Integrating the system:

Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative buildservers, Collating quality measures.

UNIT-V
Testing Tools and Deployment:

Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development. Deployment of the system: Deployment systems, Virtualization stacks, code execution atthe client, Puppet master and agents, Ansible, Deployment tools: Chef, Salt Stack and Docker.

TEXT BOOKS:

1. Joakim Verona., Practical DevOps, Packt Publishing, 2016.

REFERENCE BOOKS:

1. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wileypublications.
2. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. AddisonWesley

DATA ANALYTICS (Professional Elective – I) (22PE0CS03)

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

                                                                                     3 0 0 3

Prerequisites

1. A course on "Database Management Systems".
2. Knowledge of probability and statistics.

Course Objectives:

- To explore the fundamental concepts of data analytics.
- To learn the principles and methods of statistical analysis
- Discover interesting patterns, analyze supervised and unsupervised models and estimate theaccuracy of the algorithms.
- To understand the various search methods and visualization techniques.

Course Outcomes: After completion of this course students will be able to

- Understand the impact of data analytics for business decisions and strategy
- Carry out data analysis/statistical analysis
- To carry out standard data visualization and formal inference procedures
- Design Data Architecture
- Understand various Data Sources

UNIT - I

Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality(noise, outliers, missing values, duplicate data) and Data Processing & Processing.

UNIT - II

Data Analytics: Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of Data and Variables, Data Modeling Techniques, MissingImputations etc. Need for Business Modeling.

UNIT - III

Regression — Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc.

Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT - IV

Object Segmentation: Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc.**Time Series Methods:** Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction

UNIT - V

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:

1. Student's Handbook for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan KaufmannPublishers.

REFERENCE BOOKS:

1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway LabsJeffrey D Ullman Stanford Univ.

NATURAL LANGUAGE PROCESSING (Professional Elective – II) (22PE0CS10)

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

Prerequisites:

1. Data structures and compiler design

Course Objectives:

- Introduction to some of the problems and solutions of NLP and their relation to linguistics andstatistics.

Course Outcomes:

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluatingempirical NLP systems
- Manipulate probabilities, construct statistical models over strings and trees, and estimateparameters using supervised and unsupervised training methods.
- Design, implement, and analyze NLP algorithms; and design different language modelingTechniques.

UNIT - I

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches, Features

UNIT - II

Syntax I: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms

UNIT – III

Syntax II: Models for Ambiguity Resolution in Parsing, Multilingual Issues

Semantic Parsing I: Introduction, Semantic Interpretation, System Paradigms, Word Sense

UNIT - IV

Semantic Parsing II: Predicate-Argument Structure, Meaning Representation Systems

UNIT - V

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Bayesian parameter estimation, Language Model Adaptation, Language Models- class based, variable length, Bayesian topic based, Multilingual and Cross Lingual Language Modeling

TEXT BOOKS:

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M.Bikel and Imed Zitouni, Pearson Publication.

REFERENCE BOOK:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, PearsonPublications.
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary.

COMPUTER NETWORKS LAB (22PC0CS16)

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

                                                                          0 0 2 1

Course Objectives

- To understand the working principle of various communication protocols.
- To understand the network simulator environment and visualize a network topology andobserve its performance
- To analyze the traffic flow and the contents of protocol frames

Course Outcomes

- Implement data link layer farming methods
- Analyze error detection and error correction codes.
- Implement and analyze routing and congestion issues in network design.
- Implement Encoding and Decoding techniques used in presentation layer
- To be able to work with different network tools

List of Experiments

1. Implement the data link layer framing methods such as character, character-stuffing and bitstuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding windowprotocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting techniques used in buffers.
10. **Wireshark**
    i. Packet Capture Using Wire shark
    ii. Starting Wire shark
    iii. Viewing Captured Traffic
    iv. Analysis and Statistics & Filters.How to
    run Nmap scan
    Operating System Detection using NmapDo the
    following using NS2 Simulator
    i. NS2 Simulator-Introduction
    ii. Simulate to Find the Number of Packets Dropped
    iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
    iv. Simulate to Find the Number of Packets Dropped due to Congestion
    v. Simulate to Compare Data Rate & Throughput.
    vi. Simulate to Plot Congestion for Different Source/Destination
    vii. Simulate to Determine the Performance with respect to Transmission of Packets

TEXT BOOK:

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

REFERENCE BOOKS:

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

DEVOPS LAB (22PC0CS17)

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

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Course Objectives:

- Develop a sustainable infrastructure for applications and ensure high scalability. DevOps aimsto shorten the software development lifecycle to provide continuous delivery with high-quality.

Course Outcomes:
1. Understand the need of DevOps tools
2. Understand the environment for a software application development
3. Apply different project management, integration and development tools
4. Use Selenium tool for automated testing of application

List of Experiments:
1. Write code for a simple user registration form for an event.
2. Explore Git and GitHub commands.
3. Practice Source code management on GitHub. Experiment with the source code in exercise 1.
4. Jenkins installation and setup, explore the environment.
5. Demonstrate continuous integration and development using Jenkins.
6. Explore Docker commands for content management.
7. Develop a simple containerized application using Docker.
8. Integrate Kubernetes and Docker
9. Automate the process of running containerized application for exercise 7 using Kubernetes.
10. Install and Explore Selenium for automated testing.
11. Write a simple program in JavaScript and perform testing using Selenium.
12. Develop test cases for the above containerized application using selenium.

TEXT BOOKS:
1. Joakim Verona., Practical DevOps, Packt Publishing, 2016.

REFERENCE BOOKS:
1. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wileypublications.
2. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. AddisonWesley.

ADVANCED ENGLISH COMMUNICATION SKILLS LAB (22HS0EN03)

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

                                                                            0 0 2 1

1. INTRODUCTION:

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalized context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

2. OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

3. SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language

   – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading& effective googling.

3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/Technical report writing/* – planning for writing – improving one's writing.

4. **Activities on Presentation Skills** — Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/   e-mails/assignments etc.

5. **Activities on Group Discussion and Interview Skills** — Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and MockInterviews.

4. **MINIMUM REQUIREMENT:**

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. **SUGGESTED SOFTWARE:**

The software consisting of the prescribed topics elaborated above should be procured and used.

- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dream tech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS:

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd.2nd Edition
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCE BOOKS:

1. Learn Correct English ― A Book of Grammar, Usage and Composition by Shiv K. Kumar andHemalatha Nagarajan. Pearson 2007
2. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press2009.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. English Vocabulary in Use series, Cambridge University Press 2008.
6. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012.Cengage Learning.
7. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata McGraw-Hill 2009.

UI DESIGN-FLUTTER (22SD0CS03)

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

                                                                                                                0   0   2 1

Course Objectives:

- To learn installation of SDK of Flutter, Xcode and Android Emulator
- Understanding Stateless and Stateful Widgets and Widget Tree
- Learning of Dart basics
- Application of Animation to app.

Course Outcomes:
- Knowledge on installation of various softwares.
- Understanding of various Widgets
- Application of Animation to Apps

UNIT - I Introducing Flutter and Getting Started

Introducing Flutter, Defining Widgets and Elements, Understanding Widget Lifecycle Events, The Stateless Widget Lifecycle, The Stateful Widget Lifecycle, Understanding the Widget Tree and the Element Tree, Stateless Widget and Element Trees, Stateful Widget and Element Trees, Installing the Flutter SDK, Installing on mac OS, System Requirements, Get the Flutter SDK, Check for Dependencies, iOS Setup: Install Xcode, Android Setup: Install Android Studio, Set Up the Android Emulator, Installing on Windows, System Requirements, Get the Flutter SDK, Check for Dependencies, Install Android Studio, Set Up the Android Emulator, Installing on Linux, System Requirements, Get the Flutter SDK, Check for Dependencies, Install Android Studio, Set Up the Android Emulator, Configuring the Android Studio Editor.

UNIT - II Creating a Hello World App

Setting Up the Project, Using Hot Reload, Using Themes to Style Your App, Using a Global App Theme, Using a Theme for Part of an App, Understanding Stateless and Stateful Widgets, Using External Packages, Searching for Packages, Using Packages

UNIT - III Learning Dart Basics

Use of Dart, Commenting Code, Running the main() Entry Point, Referencing Variables, Declaring Variables, Numbers, Strings, Booleans, Lists, Maps, Runes, Using Operators, Using Flow Statements, if and else, ternary operator, for Loops, while and do-while, while and break, continue, switch and case, Using Functions, Import Packages, Using Classes, Class Inheritance, Class Mixins, Implementing Asynchronous Programming.

UNIT- IV Creating a Starter Project Template

Creating and Organizing Folders and Files, Structuring Widgets.
Understanding the Widget Tree
Introduction to Widgets, Building the Full Widget Tree, Building a Shallow Widget Tree, Refactoring with a Constant, Refactoring with a Method, Refactoring with a Widget Class.

UNIT- V Using Common Widgets

Using Basic Widgets, Safe Area, Container, Text, Rich Text, Column, Row, Column and Row Nesting, Buttons, Floating Action Button, Flat Button, Raised Button, Icon Button, Popup Menu Button, Button Bar, Using Images and Icons, Asset Bundle, Image, Icon, Using Decorators, Using the Form Widget to Validate Text Fields, Checking Orientation.

Adding Animation to an App

Using Animated Container, Using Animated Cross Fade, Using Animated Opacity, Using Animation Controlle, Using Staggered Animations,

TEXT BOOK:

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development, 1ˢᵗ edition, Wrox publisher.

REFERENCE BOOKS:

1. Flutter for Beginners: An introductory guide to building cross-platform mobile applications withFlutter and Dart 2, Packt Publishing Limited.
2. Rap Payne, Beginning App Development with Flutter: Create Cross-Platform Mobile Apps, 1ˢᵗedition, Apress.
3. Frank Zammetti, Practical Flutter: Improve your Mobile Development with Google's LatestOpen-Source SDK, 1ˢᵗ edition, Apress.

INTELLECTUAL PROPERTY RIGHTS (22MC0MB03)

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

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Course Objectives:

- Significance of intellectual property and its protection
- Introduce various forms of intellectual property

Course Outcomes:
- Distinguish and Explain various forms of IPRs.
- Identify criteria to fit one's own intellectual work in particular form of IPRs.
- Apply statutory provisions to protect particular form of IPRs.
- Appraise new developments in IPR laws at national and international level

UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copyrights: Fundamental of copyright law, originality of material, rights of reproduction, rights to perform the work publicly, copyright ownership issues, copyright registration, notice of copyright, International copyright law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets: Trade secret law, determination of trade secret status, liability for misappropriations of trade secrets, protection for submission, trade secret litigation.

Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law; copyright law, patent law, intellectual property audits.

International overview on intellectual property, international — trade mark law, copyright law, international patent law, and international development in trade secrets law.

TEXT BOOK:
1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.

REFERENCE BOOK:
1. Intellectual property right — Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd.