3-1 Syllabus and Structure

Sl. No	Course Category	Dept Course	Course Code	Course	L	T	P/D	C	Max. Marks Int.	Max. Marks Ext.
1.	OE			Open Elective-I	3	0	0	3	30	70
2.	PE			Professional Elective - I	3	0	0	3	30	70
3.	PC	IT	7F505	Design and Analysis of Algorithms	2	1	0	3	30	70
4.	PC	CSE	7EC04	Data Warehousing and Data Mining	3	1	0	4	30	70
5.	PC	CSE	7EC05	Computer Networks	3	0	0	3	30	70
6.	HS	S&H	7HC74	Soft Skills and Technical Communication	0	0	2	1	30	70
7.	BS	S&H	7H518	Quantitative Aptitude	1	1	-	2	30	70
8.	PC	CSE	7E574	Data Warehousing and Data Mining Lab	0	0	4	2	30	70
9.	PC	CSE	7EC75	Computer Networks Lab	0	0	4/2*	1	30	70
10.	PS	CSE	7F574	Design and Analysis of Algorithms Lab	0		4/2*	1	30	70
11.	PS	CSE	7E595	Technical Seminar – V	0	0	2	1	100	--
12.	PS	CSE	7E481	Summer Industry Internship-I	0	0	0	1	30	70
				Total :	**15**	**3**	**12**	**25**	**430**	**770**

* Bi weekly lab

III YEAR II SEMESTER COURSE STRUCTURE

Sl. No	Course Category	Dept Course	Course Code	Course	L	T	P/D	C	Max. Marks Int.	Max. Marks Ext.
1.	OE			Open Elective - II	3	0	0	3	30	70
2.	PE			Professional Elective – II	3	0	0	3	30	70
3.	PC	IT	7F618	Automata Theory and Compiler Design	2	1	0	3	30	70
4.	PC	CSE	7EC06	Operating Systems	2	1	0	3	30	70
5.	PC	CSE	7EC07	Web Technologies	2	1	0	3	30	70
6.	HS	BT	7GC49	Intellectual Property Rights	1	0	0	1	30	70
7.	BS	S&H	7H619	Logical Reasoning	1	1	-	2	30	70
8.	PC	IT	7F675	Compiler Design Lab	0	0	4/2*	1	30	70
9.	PC	CSE	7E676	Operating System Lab	0	0	4/2*	1	30	70
10.	PC	CSE	7EC77	Web Technologies Lab	0	0	4	2	30	70
11.	PS	CSE	7E683	Group Project	0	0	3	2	30	70
12.	PC	CSE	7E696	Comprehensive Viva - Voce II	0	0	0	1	30	70
13.	PS	CSE	7E682	Summer Industry Internship-II (Evaluation will be done along with 4-1 courses)						
				Total :	**14**	**4**	**11**	**25**	**360**	**840**

* Bi weekly lab

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B.Tech (CSE) Course Structure
Regulation: A18

</div>

IV YEAR I SEMESTER COURSE STRUCTURE

Sl. No	Course Category	Dept Course	Course Code	Course	L	T	P/D	C	Max. Int.	Max. Ext.
1.	PE			Professional Elective – III	3	0	0	3	30	70
2.	PE			Professional Elective-IV	3	0	0	3	30	70
3.	PC	IT	7F719	Software Automation and Testing	2	1	0	3	30	70
4.	PC	CSE	7EC08	Information Security	2	1	0	3	30	70
5.	PC	IT	7F708	Linux Programming	3	0	0	3	30	70
6.	PC	IT	7F778	Software Automation and Testing Lab	0	0	4	2	30	70
7.	PC	IT	7F777	Linux Programming Lab	0	0	3	1.5	30	70
8.	PC	CSE	7EC76	Information Security Lab	0	0	3	1.5	30	70
9.	PS	CSE	7E784	Project – I	0	0	4	2	30	70
10.	PS	CSE	7E682	Evaluation of Summer Industry Internship-II	-	-	-	1	30	70
				Total :	**13**	**2**	**14**	**23**	**300**	**700**

IV YEAR II SEMESTER COURSE STRUCTURE

Sl. No	Course Category	Dept Course	Course Code	Course	L	T	P/D	C	Max. Int.	Max. Ext.
1.	OE			Open Elective- III	3	0	0	3	30	70
2.	PE			Professional Elective – V	3	0	0	3	30	70
3.	PS	CSE	7E885	Project – II	-	-	10	5	30	70
				Total :	**6**	**0**	**10**	**11**	**90**	**210**

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H				M						M	

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Basics of Entrepreneurship
(Open Elective –I)

	L	T	P	C
	3	-	-	3

Code: 7ZC22

Prerequisite : Management Science

Course Objectives: The objective of the course is to make students understand the nature of Entrepreneurship, and its importance to business to the engineering students, which will allow them to get the required intuition and interest in starting their own start-up's

Course Outcomes:

At the end of this course the student will be able to

1. The students' will acquire basic knowledge on Skills of Entrepreneurship.
2. The students' will understand the techniques of selecting the customers through the process of customer segmentation and Targeting
3. Business Models and their validity are understood by the students'.
4. The basic cost structure, Revenue Streams and the pricing strategies are understood by the students'.
5. The students' will acquire knowledge about the project management and its techniques.
6. The students' get exposure on marketing strategies and business regulations for the Start up.

Unit – I: Introduction to Entrepreneurship & Self Discovery: - Define Entrepreneurship, Entrepreneurship as a Career option, Find your Flow, Stock of Your Means, Characteristics, Qualities and Skills of Entrepreneurship, Effectuation, Principles of Effectuation, Life as an Entrepreneur, Stories of Successful Entrepreneurs.

Unit – II: Opportunity & Customer Analysis: - Identify your Entrepreneurial Style, Methods of finding and understanding Customer Problems, Run Problem Interview, Process of Design Thinking, Identify Potential Problems worth Solving, Customer Segmentation, Niche Marketing and Targeting, Craft your Values Proportions, Customer-driven Innovation.

Unit – III: Business Model & Validation: - Introduction to Business Models, Lean approach to Business Model Canvas, Blue and Red Ocean Strategies, the Problem-Solution Fit, Build your Solution Demo, Solution Interview Method, Identify Minimum Viable Product (MVP), Product-Market fit test.

Unit – IV: Economics & Financial Analysis: - Revenue Analysis, Identify different Revenue Streams and Costs Analysis – Startup Cost, Fixed Cost and Variable Cost, Break Even Analysis, Profit

3

Analysis, Introduction to Pricing, different Pricing Strategies, Sources of Finance, Bootstrapping and Initial Financing, Practice pitching to Investors and Corporate.

Unit – V: Team Building & Project Management: - Leadership Styles, Shared Leadership Model, Team Building in Venture, Roles and Responsibilities of team in venture, Explore collaboration tools and techniques, Brainstorming, Introduction to Project Management, Project Life Cycle, Create a Project Plan.

Unit – VI: Marketing & Business Regulations: - Positioning, Positioning Strategies, Branding, Branding Strategies, Selecting and Measuring Channels , Customer Acquisition, Selling Process, Selling Skills, Sales Plans. Business regulations – List of Required Registrations, Compliance Check List, Business Structures and Legal Entities.

References:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd, Entrepreneurship, Sixth Edition, New Delhi, 2006.
2. Thomas W. Zimmerer, Norman M. Scarborough, Essentials of Entrepreneurship And Small Business Management, Fourth Edition, Pearson, New Delhi, 2006
3. Alfred E. Osborne, Entrepreneur's Toolkit, Harvard Business Essentials, HBS Press, USA, 2005.
4. MadhurimaLall, ShikhaSahai, Entrepreneurship, Excel Books, First Edition, New Delhi, 2006.
5. S.S. Khanka, Entrepreneurial Development, S. Chand and Company Limited, New Delhi, 2007.
6. H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
7. S.R. Bhowmik, M. Bhowmik, Entrepreneurship-A tool for Economic Growth   And A key to Business Success, New Age International Publishers, First Edition, (formerly Wiley Eastern Limited), New Delhi, 2007.
8. *https://www.wfglobal.org/*
9. *https://www.learnwise.org/#/IN/en/home/login,*

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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Introduction to Data Science
(Professional Elective –I)

	L	**T**	**P**	**C**
Code: 7EC16	**3**	**-**	**-**	**3**

Prerequisite : Probability and Statistics, OOPs concepts

Course Objectives: To know the fundamental concepts of Data Science. To explore tools and practices for working with Data Science. To learn about Principle component analysis and understand about Predictive Analytics.

Course Outcomes:

At the end of this course the student will be able to

1. Perform Data analysis on variety of data
2. Understand and apply the basic statistical operations using R.
3. Apply the concepts of functions and iterative programming using R.
4. Apply the suitable visualization techniques to output analytical results.
5. Understand and compare the dimensionality reduction techniques.
6. Implement Data analysis techniques for solving practical problems.

UNIT-I DATA TYPES & COLLECTION: Types of Data: Attributes and Measurement, What is an Attribute?, The Type of an Attribute, The Different Types of Attributes, Describing Attributes by the Number of Values, Asymmetric Attributes, Binary Attribute (Pg.No:22-29, Text Book-1), Nominal Attributes, Binary Attributes, Ordinal Attributes, Numeric Attributes, Discrete versus Continuous Attributes (Pg. No. 39-44, Text-2), Types of Data Sets, General Characteristics of Data Sets, Record Data, Transaction or Market Basket Data, The Data Matrix, The Sparse Data Matrix, Graph Based Data, Graph-Based Data, Ordered Data. Handling Non-Record Data, Data Quality, Measurement and Data Collection Issues, Precision, Bias and Accuracy. (Pg. No. 29-39, Text-1)

UNIT-II Basics of R: Introduction, R-Environment Setup, Programming with R, Basic Data Types, Vectors: Creating and Naming Vectors, Vector Arithmetic, Vector Subsetting, Matrices: Creating and Naming Matrices, Matrix Subsetting, Arrays, Class.
Factors and Data Frames: Introduction to Factors: Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, Subsetting of Data Frames, Extending Data Frames, Sorting Data Frames. (Text Book-3)

UNIT-III Lists: Introduction, Creating a List: Creating a Named List, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting Lists to Vectors, Conditionals and **Control Flow:** Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements.

Iterative Programming in R: Introduction, While Loop, For Loop, Looping Over List.
Functions in R: Introduction, Writing a Function in R, Nested Functions, Function Scoping, Recursion, Loading an R Package, Mathematical Functions in R.(Text Book -4)

UNIT-IV: DATA VISUALIZATION Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations. (Pg. No. 56-64, Text-2)
Charts and Graphs : Introduction, Pie Chart: Chart Legend, Bar Chart, Box Plot, Histogram, Line Graph: Multiple Lines in Line Graph, Scatter Plot.(Text Book-4)

UNIT-V: DIMENSIONALITY REDUCTION Eigen values and Eigenvectors of Symmetric Matrices, Definitions, Computing Eigen values and Eigenvectors, The Matrix of Eigenvectors, Principal-Component Analysis, An Illustrative Example, Using Eigenvectors for Dimensionality Reduction, Singular-Value Decomposition, Definition of SVD, Interpretation of SVD, Dimensionality Reduction Using SVD (Pg. No.405-422, Text Book-3)

UNIT VI PREDICTIVE ANALYTICS Data Interfaces: Introduction, CSV Files: Syntax, Importing a CSV File
Statistical Applications: Introduction, Basic Statistical Operations, Linear Regression Analysis, Chi-Squared Goodness of Fit Test, Chi-Squared Test of Independence, Multiple Regression. (Text Book-4)

TEXT BOOKS:

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Education Inc.
2. Han, Jiawei, Jian Pei, and Micheline Kamber, "Data mining: concepts and techniques", 3 rd Edition, Elsevier, 2011.
3. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, Mining of Massive Datasets, Cambridge University Press
4. K G Srinivas ,G M Siddesh "Statistical programming in R", Oxford Publications.

REFERENCE BOOKS:

1. Brain S. Everitt, "A Handbook of Statistical Analysis Using R", Second Edition, 4 LLC, 2014.
2. Dalgaard, Peter, "Introductory statistics with R", Springer Science & Business Media, 2008.
3. Samir Madhavan, "Mastering Python for Data Science", Packt, 2015.
4. Paul Teetor, "R Cookbook, O'Reilly, 2011.

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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Design and Analysis of Algorithms
(Common to all branches)

Code: 7F505

L	T	P	C
2	1	0	3

Prerequisite : Data structures

Course Objectives: To provide a solid foundation in algorithm design and analysis Specifically, the student learning outcomes include: Basic knowledge of graph and matching algorithms. Ability to understand and design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch and bound.

Course Outcomes:

At the end of this course the student will be able to

1) Analyze worst-case running times of algorithms using asymptotic analysis.
2) Describe the divide-and-conquer paradigm and explain when an algorithmic design
   Situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
3) Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
4) Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analyze them.
5) Describe Backtracking and Branch and Bound algorithms and also identify the scenarios for its applicability.
6) Comprehend the concept of P and NP Problems and its usage in the applications.

UNIT I: Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.
Applications: Designing optimal solution with respect to time for a problem.

UNIT II: Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication. Applications: PNR number Search, sorting the google search results.

UNIT III : Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.
Applications: Allocation of funds/resources based on the priority in the computer systems.

UNIT IV: Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design. Applications: Routing Algorithms in the computer networking

UNIT V: Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. Branch and Bound: General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. Applications: Undo in MS-Word, Games

UNIT VI: Introduction to NP-Hard and NP-Complete problems: Basic concepts of non deterministic algorithms, Definitions of NP-Hard and NP-Complete classes, Modular Arithmetic.
Applications: Performance evaluation in the dynamic systems.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz,Satraj Sahni and Rajasekharam,Galgotia publications pvt. Ltd.

2. Algorithm Design: Foundations, Analysis and Internet examples, M.T.Goodrich and R.Tomassia,John wiley and sons.

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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Data Warehousing and Data Mining

	L	T	P	C
Code: 7EC04	**3**	**1**	**0**	**4**

Prerequisite : Data structures, Database Mangement Systems

Course Objectives: Principles of Data Mining and Pre-processing techniques. Architecture of a Data Warehouse and OLAP operations. Concepts on Attribute Relevance Analysis and Data Mining Query Language. Implementation of Apriori and FP growth Algorithms Implementation of Classification Algorithms of Naïve Baye's & ID3 Decision Tree etc. Various categories of Clustering Algorithms

Course Outcomes:

At the end of this course the student will be able to

1. Fundamentals of Data Mining and various data preprocessing techniques. and the Data Mining Query language primitives.
2. Identify the schemas used in designing Architecture of Data warehouse and OLAP operations.
3. Learn the significance and methods used for Characterization and the Analysis of Attribute Relevance..
4. Applications of Apriori and FP Growth algorithms for mining Association rules in large databases.
5. Applications of various classification models like Naïve Baye's & ID3 Decision Tree along with the prediction of the new samples.
6. Applications of clustering techniques available for numerous applications. Identify the optimal clustering technique for a particular application

UNIT – I: Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.
Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Applications.

UNIT – II: Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation

UNIT – III: Concepts Description: Characterization and Comparison: Data Mining Primitives, Data Mining Query Languages, Architectures of Data Mining Systems. Data Generalization and Summarization-Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Descriptive Statistical Measures in Large Databases.

UNIT – IV: Mining Association Rules in Large Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases.

UNIT – V: Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, k-nearest neighbor classifier, Prediction, Classifier Accuracy.

UNIT – VI: Cluster Analysis Introduction: Introduction to machine learning, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

TEXT BOOK:
1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber Harcourt India.

REFERENCES:
1. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson Education
2. Data Mining Techniques – Arun K Pujari, University Press.
3. Data Warehousing in the Real World – Sam Anahory & Dennis Murray, Pearson Education Asia.
4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley Student Edition.
5. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley Student Edition
6. Introduction to Data Mining - First Edition, by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, ISBN-13: 978-0321321367.

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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Computer Networks

	L	T	P	C
Code: 7EC05	3	-	-	3

Prerequisite : Data Communication

Course Objectives:
Understand primitives of computer networks Learn flow control, error control and access control mechanisms. Learn routing and congestion control algorithms, internet protocols. Understand Transport layer entities such as DNS and HTTP.

Course Outcomes:

At the end of this course the student will be able to

1 Identify the different types of network topologies and protocols useful for real time applications and transmission medias.
2 Discuss design issues of data link layer and solve problems on Checksum and flow control.
3 Describe Channel allocation issues, MAC protocols such as ALOHA, CSMA and CSMA/CD and MAC addresses with IEEE 802.X and wireless LAN.
4 Discuss network layer design issues, routing algorithms and Internetworking concepts.
5 Discuss network layer sub netting concepts, its protocols of control and congestion and QOS.
6 Describe concepts and services and protocols of transport, Application layers along with the network security issues.

UNIT I Introduction: Uses of Computer Networks, Types of networks: WAN, LAN, MAN, Network Topologies, Reference models: OSI, TCP/IP.

Physical Layer: Transmission media: magnetic media, twisted pair, coaxial cable, fiber optics, wireless transmission.

UNIT II: Data link layer: Design issues in data link layer: framing, flow control, error control, Error Detection and Correction: Parity, CRC checksum, Hamming code, Flow Control: Sliding Window Protocols, Applications: Data link layer protocols HDLC, PPP.

UNIT III: Medium Access sub layer: Channel allocation problem, MAC Protocols: ALOHA, CSMA, CSMA/CD, MAC addresses, IEEE 802.X, Standard Ethernet, Wireless LANS. Bridges, Types of Bridges.

UNIT IV: Network Layer: Design issues in Network Layer, Virtual circuit and Datagram subnets-Routing algorithm: Shortest path routing, Flooding, distance vector routing, Link state routing, Hierarchical routing, Broad casting, Multi casting, Routing for mobile hosts.

Internetworking: Concatenated Virtual Circuits, Connectionless internetworking, Tunneling, Internetwork routing, Fragmentation

UNIT V: Network layer in internet: IPv4, IP addresses, Sub netting, Super netting, NAT.Internet control protocols: ICMP, ARP, RARP, DHCP**.**
Congestion Control: Principles of Congestion, Congestion Prevention Policies.
Congestion Control in datagram Subnet: Choke packet, load shedding, jitter control.
Quality of Service: Leaky Bucket algorithm and token bucket algorithm.

UNIT VI: Transport Layer: Transport Services, Connection establishment, Connection release and TCP and UDP protocols.
Application Layer: Domain name system, FTP, HTTP, SMTP, WWW.

TEXT BOOKS:

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
2. Data Communications and Networking – Behrouz A. Forouzan.Third Edition TMH.
3. Data Communication and Networks-Bhushan Trivedi-OXFORD Publications.

REFERENCES:
1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Soft Skills and Technical Communication

	L	T	P	C
Code: 7HC74	0	0	2	1

Prerequisite : English

Course Objectives: The objective of the course is to help students in up-skilling themselves to meet the expectations of the industry. The course tries to sharpen the soft skills and the technical communication skills of the students and churn them out as promising assets to the organizations they work for, in future

Course Outcomes:

At the end of this course the student will be able to

1. equip themselves with the required skillset for their career advancement
2. develop interpersonal communication skills
3. participate in group tasks and use effective language skills in interviews
4. overcome stress and enhance employability quotient
5. practice technical communication with ease

Unit 1: Know Yourself – SWOT / SWOC Analysis
1. Introduction: Importance of knowing yourself
2. Meaning of SWOT / SWOC
3. SWOT / SWOC analysis
4. Benefits of SWOT / SWOC analysis
5. SWOT / SWOC grid

   Emotional Intelligence
1. Nature and significance of Emotional Intelligence
2. Five basic competencies of Emotional Intelligence according to Goleman:
   a. Self-awareness   b. Self regulation   c. Motivation   d. Empathy
   e. Social skills.
3. Strategies to enhance Emotional Intelligence

Unit 2:Soft Skills-I
1. Introduction to Soft skills
2. Definition of Soft Skills. Difference between Soft Skills and Hard Skills
3. Importance of Soft Skills
4. **Positive Attitude:** Meaning; Difference between Attitude and Behavior
5. Attitude Building
6. Need for developing Positive Attitude

Goal Setting
1. The purpose of Goal setting
2. Types of Goals
3. How to set SMART goals

Time Management
1. Need and Importance of Time Management
2. Scheduling and prioritizing tasks
3. Identifying major time wasters

Unit 3: Soft Skills-II

Team work and Team Dynamics
1. Introduction
2. Team Vs Group
3. Stages of team building
4. Characteristics of an effective team, role of a team leader

Problem Solving
1. Definition
2. Skill sets in Problem solving
3. Steps in solving problems

Decision Making
1. Decision making: Definition, Importance of Decision Making.
2. Decision Making process

Unit 4: Technical Communication
1. Definition and importance of Technical Communication
2. Types of Technical Communication
3. Report writing: Significance, types, steps, layout and Mechanism
4. Review of technical articles.

Unit 5: Etiquette and Stress Management
1. Etiquette: Introduction and classification
2. Work place etiquette
3. Strategies to handle Stress

Unit 6:Résumé Writing andInterview Skills
Résumé: Introduction
1. Types of Résumé
2. Difference among Bio-data, Curriculum Vitaé and Résumé
3. Resume writing: Purpose and Design
4. Tips to write a winning Resume.
5. Cover letter

Interview Skills
1. Meaning and purpose of an Interview
2. Types of interviews (Face to Face / Panel Interviews/Telephonic interviews etc.)
3. Interview Preparation techniques
4. Common mistakes
5. Dress code at an interview
6. FAQs in HR Interview
7. Mock Interviews

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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Quantitative Aptitude
(Common to All Branches)

	L	T	P	C
Code: 7H518 | 1 | 1 | - | 2 |

Prerequisite: Mathematics

Course Objectives: By learning Quantative Aptitude;1.Student learns the techniques to solve all the problems in his real life.2.It can improve the numerical ability.3.The quicker methods are useful to solve the problems within the time and it is helpful in his duties.4.Quantative Aptitude helps in solving the practical life problems.5.Students can use Quantative Aptitude in everyday life to figure out mathematically.6.Student can improve his mental capacity.7.It helps in sharpening their minds.

Course Outcomes:

At the end of this course the student will be able to

1. The questions given on testing divisibility, prime number and questions of HCF and LCM .
2. The questions given on averages, percentage and profit and loss.
3. The questions given on ratio and proportion.
4. The questions given on simple and compound interest.
5. The questions given on time and work, time and distance.
6. The questions given on mensuration and data sufficiency.

UNIT I Number System: Test for Divisibility, Test of prime number, Division and Remainder – HCF and LCM of Numbers - Fractions.

UNIT II Average: Average of different groups, Replacement of some of the items - Percentage - Profit and Loss.

UNIT III Ratio and Proportion: Properties of Ratio, Comparison of Ratios, Useful Simple Results on Proportion – Partnership and Share.

UNIT IV Simple Interest: Effect of change of P, R and T on Simple Interest - Compound Interest: Conversion Period, Difference between Compound Interest and Simple Interest.

UNIT V Time and Work- Pipes and Cisterns, Time and Distance- Problems on Trains- Boats and Streams, Allegation or Mixtures.

UNIT VI Mensuration: Area of Plane Figures, Volume and Surface Area of Solid Figures.
Data Interpretation: Tabulation, Bar Graphs, Pie Charts, Line Graphs.

Text Books:
1. Quantitative Aptitude by R.S.Agarwal

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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Data Warehousing and Data Mining Lab

	L	T	P	C
Code: 7E574	0	0	4	2

Course Objectives: Learn how to build a data warehouse and query it. Learn to perform data mining tasks using a data mining toolkit. Understand the data sets and data preprocessing. Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression. Exercise the data mining techniques with varied input values for different parameters. To obtain Practical Experience Working with all real data sets. Emphasize hands-on experience working with all real data sets.

Course outcomes:

At the end of this course the student will be able to

1. Ability to work with the ETL and Mining tools.
2. Demonstrate the classification, clustering techniques on the data sets.
3. Comprehend the results obtained in the clustering, Association and Classification techniques applied on the data sets with varied input parameters.
4. Ability to apply mining techniques for realistic data.

Exercices

1. Build a Data Warehouse to perform filter transformation for the employee database.

2. Add the commission of 1000 Rs in the Salary field of Employee table using Expression Transformation.

3. Using Aggregator transformation display the average salary of employees in each departments.

4. Using Joiner transformation display the Sailor_Name form Sailors table and Boat_Name from Boats table in a new table.

5. How to load top 2 salaries for each department without using Rank Transformation and SQL queries in Source Qualifier.

6. Implement the following Multidimensional Data Models
   i.Star Schema
   ii.Snowflake Schema
   iii.Fact Constellation.

7. Compare the GRI and Apriori usage (Prepare a sample data set in Spread Sheet).

8. Determine the Drugs importance w.r.t. Age, Cholestrol and BP using C 5.0.

9. Predict the accuracy of the test data set using Neural Net model using a Case Study of Botanical data set.

10. Compare the C 5.0 and Neural Net using the sample data.

11. Using BASKETS1n dataset select the data as given below.

a) Customer age < 35 and count the customers who buy dairy and VEG products

b) Find the AVG income of customers who buy atleast 5 products

12. Using BASKETS1n dataset select the data as given below.

a) Derive the field whose homeown is 'YES' and Age > 30 and sort data w.r.t. income in Ascending order, and output only the item fields.

b) Find the mean value of salary w.r.t age={Young, Middle, Senior}.

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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Computer Networks Lab

L	T	P	C
0	0	4/2*	1

Code:7EC75
Course Objective:

To provide an understanding of the design concepts of framing Error Detection & correction, Routing, Congestion concepts and Network tools.

Course Outcomes:
At the end of this course, the student will be able to
1. Implement and analyze framing methods of data link layer.
2. Illustrate and implement error detection & correction techniques.
3. Implement and analyze different Routing Algorithm.
4. Demonstrate the execution of basic Network Commands.

Computer Networks Lab Exercises:
1. Implement the data link layer framing methods such as
   a) Character / Byte stuffing   b) Bit stuffing.
2. Implement on a data set of characters the three CRC polynomials
   a) CRC 12   b) CRC 16   c) CRC CCITT.
3. Implement Hamming code for error detection and error correction
4. Implement Dijkstra's algorithm to compute the shortest path through a graph.
5. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table for each node using distance vector routing algorithm.
6. Implement Congestion control using Leaky-Bucket Algorithm
7. Execute the basic Networking Commands

   i.   Arp
   ii. Hostname
   iii. ipconfig
   iv. ipconfig/all
   v.   Ipconfig/renew
   vi. Ipconfig/release
   Vii. Ipconfig/flushdns
   viii. Pathping
   ix. Ping
   x.   Route

xi. tracert

Beyond Syllabus
 1. Installation of NS-2
2. Demonstration of NS-2

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	H	M									

Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Design and Analysis of Algorithms Lab

	L	**T**	**P**	**C**
Code: 7F574	**0**	**-**	**4/2***	**1**

Course Objectives: To write programs in java to solve problems using divide and conquer strategy. To write programs in java to solve problems using backtracking strategy. To write programs in java to solve problems using greedy and dynamic programming techniques.

Course Outcomes:

At the end of this course the student will be able to

1. Write a C program to implement Merge sort algorithm for sorting a list of integers in ascending order.
2. Write a C program to implement Dijkstra's algorithm for the single source shortest path problem.
3. Write a C program that implements Prim's algorithm to generate minimum cost spanning tree.
4. Write a C program to implement greedy algorithm for job sequencing with deadlines.
5. Write a C program to implement Dynamic Programming algorithm for the 0/1 knapsack problem.
6. Write a C program to implement Dynamic programming algorithm for the Optimal Binary search Tree problem.
7. Write a C program to implement backtracking algorithm for n-queens problems.

Other Practice Programs:

1. Write a C program to implement Quick Sort algorithm for sorting a list of integers in ascending order.
2. Write a C program to implement the DFS algorithm for a Graph.
3. Write a C program to implement the BFS algorithm for a graph.
4. Write a C program that implements kruskal's algorithm to generate minimum cost spanning tree.
5. Write a C program to implement Floyd;s algorithm for all pairs shortest path problem.
6. Write a C program to implement the backtracking algorithm for the Hamiltonian circuit's problem.
7. Write a C program to implement backtracking algorithm for the sum of subsets problem.

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Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
Innovation and Design Thinking
(Open Elective –III)

	L	T	P	C
Code: 7ZC24	3	-	-	3

Prerequisite :Nil

Course Objectives: The objective of the course is to make students understand the nature of Innovation, creativity and IPRs, and to motivate the student to start his/her own enterprise with innovative skills.

Course Outcomes:

At the end of this course, the student will be able to

1. Express the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
2. Get exposure on creative methods of ideation and the importance of protecting the ideas.
3. Gain knowledge on design thinking and types of thinking and discuss them.
4. Gain familiarity on emerging technologies like Internet of things (IOT).
5. Understand the process and describe of building the startup
6. Comprehend knowledge on various startup funding and also to branding building for the startup.

Unit – I: Introduction to Innovation: - Meaning of Innovation, Difference between innovation and invention, Difference between Innovation and Creativity, Need to be Creative , Importance of Innovation, Innovation as a Competitive Advantage, Innovation Continuum, Innovation Cycle, Disruptive Innovation, , Breakthrough innovations and its consequences on the society, Challenges in Innovation.

Unit – II: Creative Thinking : - Types of Creative Thinking, Creative Thinking Process, Components of Creativity, Characteristics of a Creative Mindset, New product ideas, Idea generation methods, Principles of Idea Generation, Difference between Idea Generation and Brainstorming, Killing the ideas through Stage Gate Models, Process of Reverse Thinking.Intellectual Property Rights, Importance of IPR, Role of WIPO, Case Studies on Patents and Infringement of Rights.

Unit – III: Design Thinking & Liberal Art: - Concept of Design Thinking, Difference between Designer and Scientist, Stages of Design Thinking, Difference between Convergent Thinking and Divergent Thinking. Definition of Liberal Art and its Importance of Liberal Art , Role of Art and Culture to Innovate Business.

Unit – IV: Emerging Technologies: - Meaning of Internet of Things, Components of IoT, Benefits of IoT, Types of Product – Service hybrid, examples of IoT enabled Innovations, Impact of IoT on

Business, Future of IoT. Case Study on IoT.Innovation Leadership &Network: - Leadership, Skills and Characteristics of an Innovation Leadership, Meaning of Innovation Network, Significant of Innovation Network, Define Social Media Analysis, Steps to Build an Innovation Network.

Unit –V Building Startup Kelly Johnsons KISS Principle, Road map for building a startup, identify, analyze and evaluate funding, advantages of crowd funding. Pricing strategies.Determining factors for Monetizing Innovation, Process of Monetization, Fixing the price of an Innovative Project.Detailed study on market potential, pitfalls andNegative effects of Monetizing innovation.Reasons for failure of Monetization of Innovation.

Unit-VI Startup Funding & Branding Sources of funding: Bootstrapping, Angel Investors, Crowd funding, Venture capitalists, Advantages of crowd funding, Schemes of Government through Startup India, role of Institutional support and Commercial Banks. Introduction to branding a startup and developing branding strategies.

REFERENCES:

1. Peter Drucker (1993), "Innovation and Entrepreneurship", Hyper Business Book.
2. C.K. Prahalad, M.S. Krishnan, The new age of Innovation – TATA McGRAW-HILL   Edition 2008.
3. "Innovation by Design", Gerald H. (Gus) Gaynor, AMACOM {American Management Association), NYC, 2002
    a. Bholanath Dutta: Entrepreneurship – Text and cases, Excel, 2009.
    b. Vasanth Desai: Entrepreneurship, HPH, 2009
    c. Barringer: Entrepreneurship, Pearson, 2009.
    d. H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
4. John M Nicholas "Project Management for Business and Technology" Prentice Hall of India Pvt. Ltd.
    a. Stay Hungry Stay Foolish, Rashmi Bansal and published by IIM., Ahmedabad

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Syllabus for B. Tech. IV Year II semester
Computer Science and Engineering
Innovation and Design Thinking
(Open Elective –III)

	L	**T**	**P**	**C**
Code: 7ZC24	3	-	-	3

Prerequisite :Nil

Course Objectives: The objective of the course is to make students understand the nature of Innovation, creativity and IPRs, and to motivate the student to start his/her own enterprise with innovative skills.

Course Outcomes:

At the end of this course, the student will be able to

7. Express the knowledge on the inputs required for innovation and also gain familiarity on Entrepreneurship.
8. Get exposure on creative methods of ideation and the importance of protecting the ideas.
9. Gain knowledge on design thinking and types of thinking and discuss them.
10. Gain familiarity on emerging technologies like Internet of things (IOT).
11. Understand the process and describe of building the startup
12. Comprehend knowledge on various startup funding and also to branding building for the startup.

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Unit – II: Creative Thinking : - Types of Creative Thinking, Creative Thinking Process, Components of Creativity, Characteristics of a Creative Mindset, New product ideas, Idea generation methods, Principles of Idea Generation, Difference between Idea Generation and Brainstorming, Killing the ideas through Stage Gate Models, Process of Reverse Thinking.Intellectual Property Rights, Importance of IPR, Role of WIPO, Case Studies on Patents and Infringement of Rights.

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5. Peter Drucker (1993), "Innovation and Entrepreneurship", Hyper Business Book.
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7. "Innovation by Design", Gerald H. (Gus) Gaynor, AMACOM {American Management Association), NYC, 2002
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    b. Vasanth Desai: Entrepreneurship, HPH, 2009
    c. Barringer: Entrepreneurship, Pearson, 2009.
    d. H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
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Syllabus for B. Tech. III Year I semester
Computer Science and Engineering
Technical Seminar - V

	L	T	P	C
Code: 7E595	0	0	2	1

Prerequisite : All Courses till this semester

Course Objectives: Learn basics of technical paper writing and enhance verbal and writing skills, which is   useful for employabilty

Course Outcomes:

At the end of this course the student will be able to
1. Identify a topic from the current technologies of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
2. Arrange the contents of the presentation and also write the report of the research paper..
3. Present the technical topic in front of the panel and the fellow students, using the oratory skills and also submit the report of the research paper.
4. Interact through answering the questions and also can add some points to the seminar.

There shall be a Technical seminar evaluated for 100 marks in Third Year First Semester. The evaluation is purely internal and will be conducted as follows:

Content   : 20 marks

Presentation including PPT   : 20 marks

Seminar Notes   : 10 marks

Interaction   : 10 marks

Report   : 25 marks

Attendance   : 10 marks

Punctuality   : 5 marks

Total   100 marks