DEPARTMENT OF INFORMATION TECHNOLOGY

Course Structure for B. Tech. (With effect from 2019-2020)

S.No	Subject	L	T	P	C	I	E
III YEAR II SEMESTER							
1	Advanced Java & Web Technologies	3	1	-	4	40	60
2	Unix & Shell Programming	3	-	-	3	40	60
3	Design and Analysis of Algorithms	3	-	-	3	40	60
	Professional Elective II						
4	1. Software Project Management 2. Machine Learning 3. NoSQL Databases 4. Computer Graphics & 3D Design	3	-	-	3	40	60
	Humanities Elective I						
5	1. Management Science 2. Life Sciences for Engineering 3. Foreign Language	3	-	-	3	40	60
6	AJWT Lab	-	-	3	1.5	40	60
7	Unix & Shell programming Lab	-	-	3	1.5	40	60
8	Advanced English Communication Skills Lab	-	-	3	1.5	40	60
9	Socially Relevant Projects (15 hrs / semester)	-	-	1	0.5	20	30
10	Industrial Training/ Internship/ Research Projects in National Laboratories/Academic Institutions *	-	-	-	-	-	-
	Total	**15**	**1**	**10**	**21**	**340**	**510**
						850	

III Year - II Semester	L	T	P	C
	3	0	0	3
ADVANCED JAVA & WEB TECHNOLOGIES				

Course Objectives:

1. To understand the concepts of HyperText Markup Language and Cascading Style Sheets.
2. To learn JavaScript for creating dynamic websites.
3. To learn the operations perform on data among web applications using XML
4. To acquire knowledge on creation of software components using JAVA Beans.
5. To learn Server-Side Programming using Servlets and Java Server Pages.
6. To learn the creation of pure Dynamic Web Application using JDBC.

Course Outcomes:

After completion of this course, the student shall be able to
At the end of this course student will:
1) Implement web based applications using features of HTML and XML
2) Develop reusable component for Graphical User Interface applications
3) Apply the concepts of server side technologies for dynamic web applications
4) Implement the web based applications using effective data base access with rich client interaction

Unit-1: Advanced JavaScript

Introduction: Javascript Variables, JavaScript Objects, Methods, Javascript Functions, Higher Order Functions and Passing Functions as Arguments, Anonymous Functions, Java Selectors, Event Listeners, Adding Event Listeners to a Button, Keyboard Event Listeners,

Unit-2: JQUERY

What is jQuery? JQuery vs Javascript, Incorporate jQuery into Websites, Minification, How Minification works, Selecting, Manipulating Elements with jQuery, Manipulating Text with jQuery, Attributes with jQuery.

Unit-3: JSP

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing. JSP application design with MVC Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations.

Unit-4: NodeJS

Introduction to NodeJS, Installing NodeJS, Node REPL (Read Evaluation Print Loops), Native Node Modules NPM- Introduction to Node Package Manager, Installing External Node Modules,

Node with Express: Creating First Server with Express, Handling Requests and Responses: the GET Request, Understanding and Working with Routes

Unit-5: API, **Application Programming Interface**

Introduction to API, What is API, Why we need API, API Endpoints, Paths and Parameters. API Authentication and Postman, JSON, Making GET Requests with the Node HTTPS Module Parse JSON.

Unit -6: Mongoose Framework

Introduction to Mongoose, Reading from Your Database with Mongoose, Data Validation with Mongoose, Updating and Deleting Data Using Mongoose, Establishing Relationships and Embedding Documents using Mongoose.

Text Books:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. Node.js Design Patterns, Mario Casciaro, Luciano Mammino

Reference Books:

1. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning

	L	T	P	C
III Year - II Semester	3	0	0	3
UNIX & SHELL PROGRAMMING				

OBJECTIVES:

- Facility with UNIX command syntax and semantics.
- Ability to read and understand specifications, scripts and programs.
- Individual capability in problem solving using the tools presented within the class.
- Students will demonstrate a mastery of the course materials and concepts within in class discussions.

UNIT-I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.

UNIT-II

The File system –The Basics of Files-What's in File-Directories and File Names-Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables--More on I/O Redirection-Looping in Shell Programs.

UNIT-IV

Filters-The Grep Family-Other Filters-AWK-Syntax of an awk Program Statement-Structure of an awk Script-Operational Mechanism of awk-Variables-Records, Fields and Special Varables,Addressing:Line and Context Addressing-Patterns-Operators-Sample Input Files-Simple awk Programs-awk Control Structures-Functions in awk-Script on a File-The First Complete Script-Executing awk Script with the Shell-Arrays-Salary Computing Script

UNIT-V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The here Document(<<)-The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command.

UNIT-VI

The Process-The Meaning-Parent and Child Processes-Types of Processes-More about Foreground and Background processes-Internal and External Commands-The ps Command-Knowing Process Attributes-Process Creation-The nohup Command-The nice Command-The time Command- Signals-The trap Command-The stty Command-The kill Command-The wait Command-Job Control Command History-Scheduling Jobs Execution

OUTCOMES:

- Mastery of the basic UNIX process structure and the UNIX file system.
- Facility with UNIX command syntax and semantics.
- Ability to read and understand specifications, scripts and programs.
- Able to create file systems and directories and operate them.
- Mastery of at least one Shell scripting language.

TEXT BOOKS:

1. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.

2. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.

REFERENCE BOOKS:

Unix and shell programming by B.M. Harwani, OXFORD university.

III Year - II Semester	L	T	P	C
	3	0	0	3
DESIGN AND ANALYSIS OF ALGORITHMS				

OBJECTIVES:

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

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

UNIT-I:

 Introduction: What is an Algorithm, Algorithm Specification, Pseudocode Conventions Recursive Algorithm, Performance Analysis, Space Complexity, Time Complexity, Amortized Complexity, Asymptotic Notation, Practical Complexities, Performance Measurement.

UNIT-II:

Divide and Conquer: General Method, Defective Chessboard, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Performance Measurement, Randomized Sorting Algorithms (Quick Sort).

UNIT-III:

The Greedy Method: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-cost Spanning Trees, Prim's Algorithm, Kruskal's Algorithms, An Optimal Randomized Algorithm, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT-IV:

Dynamic Programming: All - Pairs Shortest Paths, Single – Source Shortest paths, Traveling Salesperson Problem, 0/1 Knapsack, Reliability Design.

UNIT-V:

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles.

UNIT-VI:

Branch and Bound: The Method, Least cost (LC) Search, Control Abstraction for LC-Search, Bounding, FIFO Branch-and-Bound, LC Branch and Bound, 0/1 Knapsack Problem, LC Branch-and Bound Solution, FIFO Branch-and-Bound Solution, Travelling Salesperson.

OUTCOMES:

Students who complete the course will have demonstrated the ability to do the following:

- Analyze worst-case running times of algorithms using asymptotic analysis.
- Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-andconquer algorithms. Derive and solve recurrences describing the performance of divide and-conquer algorithms.
- 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.
- Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamicprogramming algorithms, and analyze them
- Describe the backtracking paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
- Describe the branch and bound paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamicprogramming algorithms, and analyze them

TEXT BOOKS:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press

2. Introduction to AlgorithmsThomas H. Cormen, PHI Learning

REFERENCE BOOKS

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman

2. Algorithm Design, Jon Kleinberg, Pearson.

III Year – II Semester	L	T	P	C
	3	0	0	3
PROFESSIONAL ELECTIVE II **1.SOFTWARE PROJECT MANAGEMENT**				

Course Objectives:

At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
- To compare and differentiate organization structures and project structures
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools

Course Outcomes:

Upon the completion of the course students will be able to:-

- Apply the process to be followed in the software development life-cycle models.
- Apply the concepts of project management & planning.
- Implement the project plans through managing people, communications and change
- Conduct activities necessary to successfully complete and close the Software projects
- Implement communication, modeling, and construction & deployment practices in software development.

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT II

The Old Way and The New: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process. Life Cycle Phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

UNIT III

Model Based Software Architectures: A Management perspective and technical perspective. Work Flows of the Process: Software process workflows, Iteration workflows. Checkpoints of the Process: Major mile stones, Minor Milestones, Periodic status assessments.

UNIT IV

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning. Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

UNIT V

Process Automation: Automation Building blocks, The Project Environment. Project Control and Process Instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics.

UNIT VI

Project Estimation and Management: COCOMO model, Critical Path Analysis, PERT technique.

Text Books:

1) Software Project Management, Walker Royce, Pearson Education, 2005.
2) Software Project Management, Bob Hughes, 4th edition, Mike Cotterell, TMH.

Reference Books:

1) Software Project Management, Joel Henry, Pearson Education.
2) Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005.
3) Effective Software Project Management, Robert K.Wysocki, Wiley,2006.

III Year - II Semester	L	T	P	C
	0	0	3	1.5
AJWT LAB				

Course Objectives

From the course the student will learn
- Translate user requirements into the overall architecture and implementation of new systems and Manage Project and coordinate with the Client.
- Writing optimized front end code HTML and JavaScript.
- Design and implementation of Web Applications.

Course Outcomes

After the completion of the course, student will be able to:

1. Create web pages using HTML and Cascading Styles Sheets and Javascript.
2. Build dynamic web pages using Java Script
3. Develop server-side programs using NodeJS
4. Use API's to communicate with the server.

Exercises:

1. Write a program to log key-presses in websites using vanilla JavaScript as well as Jquery.

2. Design a BMI Calculator applications using Node and Express

3. Create a simple ToDoList app using Express and Node & Body Parser

4. Create a simple blog application using Node and Express.

5. Design a program using Node, Express that can fetch weather data dynamically using OpennWeather API.

6. Design a program to call API continuously from server side itself in Node.js/Express.js

7. Write a program to push Mongoose multiple collections using Node.js.

8. Implement mongoose along with mongoDB in To- Do-list app to make the data persistent in the app.

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3. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
4. Node.js Design Patterns, Mario Casciaro, Luciano Mammino

Reference Books:

2. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning

III Year - II Semester	L	T	P	C
	0	0	3	1.5
UNIX & SHELL PROGRAMMING LAB				

OBJECTIVES:
• Facility with UNIX command syntax and semantics.
• Ability to read and understand specifications, scripts and programs.
• Individual capability in problem solving using the tools presented within the class.
• Students will demonstrate a mastery of the course materials and concepts within in class discussions.

OUTCOMES:
□ Mastery of the basic UNIX process structure and the UNIX file system.
□ Facility with UNIX command syntax and semantics.
□ Ability to read and understand specifications, scripts and programs.
□ Able to create file systems and directories and operate them.
□ Mastery of at least one Shell scripting language.

1. Basic UNIX Commands
2. Write a Program to print Fibonacci Series using Shell Scripting.
3. Write a Program to design Calculator using Shell Scripting.
4. File Operations: Write a Shell Script to check if a file exists, Write a shell script to check if a directory exits or not, Write a Shell Script to check if a file is readable, writable and executable.
5. Write a shell program for Base Conversions
6. Usage of cut and grep commands
7. Managing User Accounts
8. User Quota Management
9. Installation of RPM software and Zipping, tar
10. Configuring Web server

	L	**T**	**P**	**C**
III Year - II Semester	**0**	**0**	**3**	**1.5**
ADVANCED ENGLISH COMMUNICATION SKILLS LAB				

COURSE OBJECTIVES:

- ➤ To expose students to different contexts through right vocabulary
- ➤ To inculcate the habit of reading and understanding any text
- ➤ To enable students to acquire the ability of writing for business purposes
- ➤ To enable students to acquire interview skills and group discussion dynamics

COURSE OUTCOMES:

Upon the completion of the course, the student will be able to:

CO1: Choose vocabulary contextually.

CO2: Comprehend, analyze and interpret the text in a definite time frame.

CO3: Write resumes cohesively and coherently.

CO4: Construct and elaborate on a given topic.

CO5: Comprehend and practice the dynamics of group discussion.

CO6: Comprehend the concept and process of interview; answering through mock interviews.

UNIT – I

Selected High GRE Words, Idioms & Phrases – Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases, collocations. **(2 sessions)**

UNIT – II

Reading Comprehension – General Vs Local Comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning. **(2 sessions)**

UNIT – III

Writing Skills – Structure of Resume writing —Short Report Writing (Business/Technical) - **(2 sessions)**

UNIT – IV

Presentations (Technical)

UNIT – V

Group Discussion – Dynamics of Group Discussion, Intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation**. (2 sessions)**

UNIT – VI

Interview Skills – Concept and process – pre-interview planning, opening strategies, answering strategies, interview through teleconference & video-conference and mock interviews. **(3 sessions)**

SUGGESTED SOFTWARE:

1. K-Van solutions Software with CD
2. Oxford advanced learner's compass, 7th Edition

SUGGESTED READING:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

2. Business and Professional Communiction: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.

3. English Vocabulary in Use Series, Cambridge University Press 2008.

4. Communication Skills by Leena Sen, PHI Learning Pvt. Ltd., New Delhi, 2009.

5. A Course Book of Advanced Communication Skills Lab published by University Press, Hyderabad.