



Rajagiri School of Engineering & Technology, Autonomous

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# **SEMESTER 5**

**PERIOD: JULY 2024 - NOVEMBER 2024**

**RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY**  
**Department of Information Technology,**

**Vision**

To evolve into a centre of excellence in information technology by creation and exchange of knowledge through leading edge research, innovation and services, which will in turn contribute towards solving complex societal problems and thus building a peaceful and prosperous mankind.

**Mission**

To impart high quality technical education, research training, professionalism and strong ethical values in the young minds for ensuring their productive careers in industry and academia so as to work with a commitment to the betterment of mankind.

**Programme Educational Objectives (PEO)**

Graduates of Information Technology program shall

PEO 1: Have strong technical foundation for successful professional careers and to evolve as key-players/ entrepreneurs in the field of information technology.

PEO 2: Excel in analyzing, formulating and solving engineering problems to promote life-long learning, to develop applications, resulting in the betterment of the society.

PEO 3: Have leadership skills and awareness on professional ethics and codes.

**Programme Outcomes (PO)**

*Information Technology Program Students will be able to:*

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

**PO2.** Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3.** Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4.** Conduct investigations of complex problems: Use research-based knowledge and research

methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5.** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6.** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7.** Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

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

**PO10.** Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11.** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12.** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcomes (PSO)**

*Information Technology Program Students will be able to:*

**PSO1:** Acquire skills to design, analyze and develop algorithms and implement those using high-level programming languages.

**PSO2:** Contribute their engineering skills in computing and information engineering domains like network design and administration, database design and knowledge engineering.

**PSO3:** Develop strong skills in systematic planning, developing, testing, implementing and providing IT solutions for different domains which helps in the betterment of life.

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# **101004/IT500A**

# **Web Application Development**

### COURSE INFORMATION SHEET

PROGRAMME: <b>Information Technology</b>	DEGREE: <b>B.TECH</b>
COURSE: <b>Web Application Development</b>	SEMESTER: <b>Fifth</b> CREDITS: <b>4</b>
COURSE CODE: 101004/IT500A REGULATION: <b>2021</b>	COURSE TYPE: <b>CORE</b>
COURSE AREA/DOMAIN: <b>Programming</b>	CONTACT HOURS: <b>3L,1T hours/Week</b>
CORRESPONDING LAB COURSE CODE (IF ANY): 101004/IT522A	LAB COURSE NAME: <b>Web Application Development Lab</b>

#### SYLLABUS:

UNIT	DETAILS	HOURS
I	Module 1: INTRODUCTION TO WEB DESIGNING Web Design Basics: Who is the Site For?, Why People Visit your Website?, What Information Your Visitors Need?, Site maps, wireframes, Getting your message across using design, Visual hierarchy, grouping and similarity, Designing Navigation, Search Engine Optimization (SEO), Analytics, Domain Names & Hosting, Ftp & Third party tools. HTML5: Introduction to HTML5, Basic Structure for HTML, Basic HTML tags -Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, Internal linking, meta elements, New HTML5 Form input Types, input and data list elements, autocomplete Attribute, Page-Structure Elements	8
II	Module 2: STYLE WITH CSS Introduction to CSS: Introduction to CSS, Block and Inline Elements, Inline Styles, using internal CSS, using external CSS, How CSS rules cascade, inheritance, why use external stylesheets? CSS3 Basics: CSS selectors, color: foreground color, background color, contrast, opacity; text: Typeface terminology, Specifying Typefaces, font -size, font -weight, font -style, text-transform, text-decoration, line-height, letter-spacing, word-spacing, text-align, vertical-align, text-indent, text-shadow; responding to users; box: box dimensions, limiting width, limiting height, overflow; border margin and padding, centering content, change inline/blocks, hiding boxes, box shadows, rounded corners; list tables and forms: list-style, table properties, styling forms, styling text input Layout and positioning: layout: key concepts in positioning elements, controlling the position of elements: relative positioning, absolute positioning, fixed positioning, z -index, float, clear, creating multi column layout with float, fixed width layout, liquid layout, layout grids, Images: controlling size of images in CSS, aligning images using CSS, centering images using CSS, background images, gradients, Media Queries	9



III	<p><b>Module 3: INTRODUCTION TO JAVASCRIPT</b></p> <p>JavaScript: How JavaScript makes the webpages more interactive, examples of JavaScript in browser, Basic JavaScript instructions: statements, comments, variable, data types, arrays, expressions, operators; functions methods and objects: function, anonymous function, variable scope, object, this, arrays are objects, browser object model, document object model, Global objects: string, number, math, date. Decision making and Loops: decision making: if statement, if..else statement, switch statement, loops:key loop concepts, for loops, while loops, do while loops; DOM: Document Object Model (DOM), the DOM tree as a model of a web page, working with DOM tree, accessing elements, nodelists, selecting elements: using class attribute, tag name, CSS selectors; repeating actions for an entire nodelist, looping through a nodelist, traversing the DOM, adding or removing html content, update text and markup, adding/removing elements.</p> <p>Event handling: different event types and ways to bind an event to an element: using DOM event handlers, using event listeners, using parameters with event listeners; the event object, event delegation, user interface events, event bubbling</p>	9
IV	<p><b>Module 4: JAVASCRIPT ADVANCED</b></p> <p>ECMA Script: ECMA Script versions, ES5 Features, ES6 introduction, Var Declarations and Hoisting, let declaration, Constant declaration, function with default parameter values, default parameter expressions, unnamed parameters, the spread operator, arrow functions, object destructuring, array destructuring, sets and maps, Array.find(), Array.findIndex(), template strings, Javascript classes, callbacks, promises, async/await</p> <p>AJAX: What is Ajax? , Why use Ajax?, How Ajax works?, Handling Ajax request and response, data formats: XML, JSON; Working with JSON data, Loading HTML with Ajax, Loading XML with Ajax, Loading JSON with Ajax, working with data from other servers</p> <p>JQuery : What is JQuery ?, A basic JQuery example, Why use JQuery ?, finding elements, JQuery selection, getting element content, updating elements, changing content, inserting elements, adding new content, getting and setting attributes, getting and sett ing CSS properties, using .each(), events, event object, effects, animating CSS properties, using animation, traversing the DOM, working with forms, JavaScript libraries, JQuery and Ajax</p>	10
V	<p><b>Module 5: BACK END DEVELOPMENT</b></p> <p>Web Servers: Introduction, HTTP Transactions, Multitier Application Architecture, Client - Side Scripting versus Server-Side Scripting, Accessing Web Servers. Server Side Scripting with Node.js: Getting to know node, node.js changed JavaScript forever, features of node, when to use and not use node, asynchronous callbacks, the NoSql movement, node and MongoDB in the wild, Hello World in Node, package.json, modules,</p> <p>Built-in Modules: FS Module, HTTP Module, Events; Node Package Manager(npm), web server using http, node.js with express, middleware, routing in express, CRUD</p>	9

	operations in express, web server using express, making it live on Heroku Node.js with MongoDB: basics of MongoDB, MongoDB CRUD Operations, Building a data model with MongoDB and Mongoose, Defining simple mongoose schemas, build node express app with MongoDB	
TOTAL HOURS		45

**TEXT/REFERENCE BOOKS:**

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, "Internet and World Wide Web How To Program", 5/E, Pearson Education, 2012. 2. Jon Duckett, "HTML and CSS: Design and Build Websites", Wiley 3. Jon Duckett, "JavaScript and JQuery : Interactive Front -End Web Development", Wiley 4. Nicholas C. Zakas, "Understanding ECMAScript 6: The Definitive Guide for JavaScript Developers"
R	1. Alex Young, Marc Harter, "Node js in practice", Manning. 2. Jason Krol, "Web Development with MongoDB and node js", Packt 3. Krishna Rungta, "Node JS: learn in one day"

**COURSE PRE-REQUISITES: Basics of Programming**
**COURSE OBJECTIVES:**

Web Application Development course is intended to deliver the elementary concepts of Web Application Development with HTML, CSS, JavaScript, JQuery, Node JS and MongoDB thereby equipping them to develop real time web applications.

**COURSE OUTCOMES: After the completion of the course the student will be able to**

CO1	Identify HTML5 elements in webpages (Cognitive Knowledge Level 2:Understand)
CO2	Implement Cascading Stylesheet to add style in HTML pages (Cognitive Knowledge Level 3: Apply)
CO3	Apply JavaScript to add functionality to web pages (Cognitive Knowledge Level 3: Apply)
CO4	Use Ajax & JQuery to enhance the functioning of web pages (Cognitive Knowledge Level 3: Apply)
CO5	Develop web applications with HTML, CSS, JavaScript, Node JS and MongoDB (Cognitive Knowledge Level 3: Apply)

**CO-PO AND CO-PSO MAPPING**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
<b>CO1</b>	1	2	2		2								3		3
<b>CO2</b>	1	2	2		2								3		3
<b>CO3</b>	2	2	1		2								3		3
<b>CO4</b>	2	2	1		3							1	3		3
<b>CO5</b>	2	3	1	1	3							2	3	2	3

**JUSTIFICATIONS FOR CO-PO/PSO MAPPING**

<b>MAPPING</b>	<b>LOW /ME DIU M/HIGH</b>	<b>JUSTIFICATION</b>
CO1-PO1	L	The knowledge in designing methodologies helps in designing solutions for engineering fundamentals.
CO1-PO2	M	The knowledge in designing methodologies helps in designing solutions for engineering sciences.
CO1-PO3	M	The knowledge in designing components helps in designing system components.
CO1-PO5	M	The knowledge in HTML5 elements helps in Creating, selecting, and applying appropriate techniques, resources, and modern engineering and IT tools
CO1-PSO1	H	The knowledge in HTML5 elements helps in acquiring skills to design and develop in high level programming languages.
CO1-PSO3	H	The knowledge in HTML5 elements helps in developing strong skills in design and implementing IT solutions in different domains.
CO2-PO1	L	The knowledge in designing styles methodologies helps in designing solutions for engineering fundamentals.
CO2-PO2	M	The knowledge in designing styles methodologies helps in designing solutions for engineering sciences.
CO2-PO3	M	The knowledge in designing style components helps in designing system components.
CO2-PO5	M	The knowledge in CSS elements helps in Creating, selecting, and applying appropriate techniques, resources, and modern engineering and IT tools
CO2-PSO1	H	The knowledge in CSS helps in acquiring skills to design and develop in high level programming languages
CO2-PSO3	H	The knowledge in CSS elements helps in developing strong skills in design and implementing IT solutions in different domains.

CO3-PO1	M	The knowledge in JavaScript programming helps in designing solutions for complex engineering problems.
CO3-PO2	M	The knowledge in JavaScript programming helps in formulating and analyzing complex engineering problems for engineering sciences.
CO3-PO3	L	The knowledge in JavaScript programming helps to design solutions for complex engineering problems.
CO3-PO5	M	The knowledge in JavaScript Programming helps in Creating, selecting, and applying appropriate techniques, resources, and modern engineering and IT tools
CO3-PS01	H	The knowledge in JavaScript helps in acquiring skills to design and develop in high level programming languages
CO3-PS03	H	The knowledge in JavaScript elements helps in developing strong skills in design and implementing IT solutions in different domains.
CO4-PO1	M	The knowledge in Ajax & JQuery helps in designing solutions for complex engineering problems.
CO4-PO2	M	The knowledge in Ajax & JQuery helps in formulating and analyzing complex engineering problems for engineering sciences.
CO4-PO3	L	The knowledge in Ajax & JQuery helps to design system components.
CO4-PO5	M	The use of Ajax & JQuery helps in Creating, selecting, and applying appropriate techniques, resources, and modern engineering and IT tools
CO4-PO12	L	The use of Ajax & JQuery helps to recognize the need for broadest changes in context of technology.
CO4-PS01	H	The use of Ajax & JQuery helps in acquiring skills to design and develop in high level programming languages
CO4-PS03	H	The knowledge in Ajax & JQuery helps in developing strong skills in design and implementing IT solutions in different domains.
CO5-PO1	M	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps in designing engineering specialization for complex engineering problems.
CO5-PO2	H	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps in formulating and analyzing complex engineering problems for engineering sciences.
CO5-PO3	L	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps to design system components.
CO5-PO4	L	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps in research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

C05-P05	H	The use of HTML, CSS, JavaScript, Node JS and MongoDB helps in Creating, selecting, and applying appropriate techniques, resources, and modern engineering and IT tools
C05-P012	M	The use of HTML, CSS, JavaScript, Node JS and MongoDB helps to recognize the need for broadest changes in context of technology.
C05-PS01	H	The use of HTML, CSS, JavaScript, Node JS and MongoDB helps in acquiring skills to design and develop in high level programming languages
C05-PS02	M	The use of Node JS and MongoDB contribute engineering skills in database design.
C05-PS03	H	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps in developing strong skills in design and implementing IT solutions in different domains.

**GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:**

SNO	DESCRIPTION	PROPOSED ACTIONS	PO	PSO
1	Web application testing improve the performance	Provide learning material	7,11	1,2,3

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

**TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:**

SNO	DESCRIPTION	PO	PSO
1	Authentication, Authorization, Personalization, OWASP	1,3,4	1,2,3

**WEB SOURCE REFERENCES:**

1	<a href="https://dataman.bioinformatics.ic.ac.uk/computer_skills/lectures/htmlcss.pdf">https://dataman.bioinformatics.ic.ac.uk/computer_skills/lectures/htmlcss.pdf</a>
2	<a href="https://github.com/PacktPublishing/HTML-CSS-and-JavaScript-for-Beginners---A-Web-Design-Course/find/master">https://github.com/PacktPublishing/HTML-CSS-and-JavaScript-for-Beginners---A-Web-Design-Course/find/master</a>
3	<a href="https://buildmedia.readthedocs.org/media/pdf/htmlguide/latest/htmlguide.pdf">https://buildmedia.readthedocs.org/media/pdf/htmlguide/latest/htmlguide.pdf</a>
4	<a href="http://projanco.com/Library/Ajax%20Programming%20for%20the%20Absolute%20Beginner.pdf">http://projanco.com/Library/Ajax%20Programming%20for%20the%20Absolute%20Beginner.pdf</a>
5	<a href="https://www.tutorialspoint.com/jquery/jquery_tutorial.pdf">https://www.tutorialspoint.com/jquery/jquery_tutorial.pdf</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

<input checked="" type="checkbox"/> CHALK & TALK	<input checked="" type="checkbox"/> STUD. ASSIGNMENT	<input checked="" type="checkbox"/> WEB RESOURCES
<input checked="" type="checkbox"/> LCD/SMART BOARDS	<input checked="" type="checkbox"/> STUD. SEMINARS	<input checked="" type="checkbox"/> ADD-ON COURSES

**ASSESSMENT METHODOLOGIES-DIRECT**

<input checked="" type="checkbox"/> ASSIGNMENTS	<input checked="" type="checkbox"/> STUD. SEMINARS	<input checked="" type="checkbox"/> TESTS/MODEL EXAMS	<input checked="" type="checkbox"/> UNIV. EXAMINATION
<input checked="" type="checkbox"/> STUD. LAB PRACTICES	<input checked="" type="checkbox"/> STUD. VIVA	<input checked="" type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> OTHERS		

**ASSESSMENT METHODOLOGIES-INDIRECT**

<input checked="" type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input checked="" type="checkbox"/> STUDENT FEEDBACK ON FACULTY (TWICE)
<input checked="" type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

**Prepared by**  
**Mr. Tinku Soman Jacob**

**Approved by**  
**(HOD)**

### Course Plan

No	Topics	No of Lectures (in hours)
1	Introduction to web designing	8
1.1	Web Design Basics: Who is the Site For?, Why People Visit your Website, What Information Your Visitors Need?, Site maps, wireframes, Getting your message across using design, Visual hierarchy, grouping and similarity, Designing Navigation, Search Engine Optimization (SEO), Analytics, Domain Names & Hosting, Ftp & Third party tools	2
1.2	HTML5: Introduction to HTML5, Basic Structure for HTML, Basic HTML tags -Headings, Linking, Images, Special Characters and Horizontal Rules	2
1.3	Lists, Tables, Forms, Internal Linking, meta elements, New HTML5 Form input Types	2
1.4	input and data list elements, autocomplete Attribute, Page-Structure Elements	2
2	Style with CSS	9
2.1	Introduction To CSS: Introduction to CSS, Block and Inline Elements, Inline Styles, Using internal CSS, Using external CSS, How CSS rules cascade, inheritance, why use external style sheets?	2
2.2	CSS3 Basics: CSS selectors, color: foreground color, background color, contrast, opacity; text: Typeface terminology, Specifying Typefaces, font -size, font -weight, font -style, text-transform, text -decoration, line -height, letter-spacing, word -spacing, text-align, vertical-align, text-indent, text -shadow; responding to users; box: box dimensions, limiting width, limiting height, overflow; border margin and padding, centering content, change inline/blocks, hiding boxes, box shadows, rounded corners	2
2.3	list tables and forms: list-style, table properties, styling forms, styling text input	1
2.4	Layout and positioning: layout: key concepts in positioning elements, controlling the position of elements: relative positioning, absolute positioning, fixed positioning, z -index, float, clear, creating multi column layout with float, fixed width layout, liquid layout, layout grids,	2
2.5	Images: controlling size of images in CSS, aligning images using CSS, centering images using CSS, background images, gradients, Media Queries	2
3	Introduction To JavaScript	9
3.1	JavaScript: How JavaScript makes the webpages more interactive, examples of JavaScript in browser, Basic JavaScript instructions: statements, comments, variable, data types, arrays, expressions, operators; functions methods and objects: function, anonymous function, variable scope, object, this, arrays are objects, browser object model, document object model, Global objects: string, number, math, date;	2

3.2	Decision making and Loops: decision making: if statement, if...else statement, switch statement, loops: key loop concepts, for loops, while loops, do while loops;	2
3.3	DOM: Document Object Model (DOM), the DOM tree as a model of a web page, working with DOM tree, accessing elements, nodelists, selecting elements: using class attribute, tag name, CSS selectors; repeating actions for an entire nodelist, looping through a nodelist,	2
3.4	traversing the DOM, adding or removing html content, update text and markup, adding/removing elements	1
3.5	Event handling: different event types, three ways to bind an event to an element, using DOM event handlers, using event listeners, using parameters with event listeners, the event object, event delegation, user interface events, event bubbling	2
4	JavaScript Advanced	10
4.1	ECMA Script: ECMA Script versions, ES5 Features, ES6 introduction, Var Declarations and Hoisting, let declaration, Constant declaration, function with default parameter values, default parameter expressions, unnamed parameters, the spread operator, arrow functions, object destructuring, array destructuring, sets and maps, Array.find, Array.findIndex, template strings	2
4.2	JavaScript classes, callbacks, promises, async/await	1
4.3 4.4	AJAX: What is Ajax?, Why use Ajax?, How Ajax works?, Handling Ajax request and response, data formats: XML, JSON; Working with JSON data, Loading HTML with Ajax	2
4.5	Loading XML with Ajax, Loading JSON with Ajax, working with data from other servers	1
4.6	JQUERY : What is JQuery ?, A basic JQuery example, Why use JQuery ?, finding elements, JQuery selection, getting element content, updating elements, changing content, inserting elements, adding new content, getting and setting attributes	2
4.7	getting and setting CSS properties, using .each(), events, event object, effects, animating CSS properties, using animation, traversing the DOM, working with forms, JavaScript libraries, JQuery and Ajax	2
5	Back End Development	9
5.1	Web Servers: Introduction, HTTP Transactions, Multitier Application Architecture, Client-Side Scripting versus Server-Side Scripting, Accessing Web Servers.	2
5.2	Server Side Scripting with Node.js: Getting to know node, node.js changed JavaScript forever, features of node, when to use and not use node, asynchronous callbacks, the NoSql movement, node and MongoDB in the wild, Hello World in Node, package.json, modules,	2
5.3	Built-in Modules: FS Module, HTTP Module, Events; Node Package Manager(npm), web server using http, node.js with express,	2



	middleware, routing in express, CRUD operations in express, web server using express, making it live on Heroku	
5.4	Node.js with MongoDB: basics of MongoDB, MongoDB CRUD Operations, Building a data model with MongoDB and Mongoose	2
5.5	Defining simple mongoose schemas, build node express app with MongoDB	1

## Tutorial-1

- Design a simple webpage with the attached format that promotes an item/entity

Logo

Primary nav

Primary nav

Primary nav

Search

---

Secondary nav

Secondary nav

Secondary nav

Secondary nav

Secondary nav

### Main article heading

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quae sunt igitur communia vobis cum antiquis, his sic utamur quasi concessis; Nihil acciderat ei, quod nollet, nisi quod anulum, quo delectabatur, in mari abiecerat. Unum est sine dolore esse, alterum cum voluptate. Laboro autem non sine causa; Theophrasti igitur, inquit, tibi liber ille placet de beata vita? Nihil opus est exemplis hoc facere longius. Duo Reges constructio Interrete. Graecum enim hunc versum noctis omnes Suavis laborum est praeteritorum memoria. Haec et tu ita posuisti, et verba vestra sunt.

### Article secondary heading

Nos commodius agimus. A mene tu? Tantum dico, magis fuisse vestrum agere Epicuri diem natalem, quam illius testamento cavere ut ageretur. Tenebre igitur, inquam, Hieronymus Rhodius quid dicat esse summum bonum, quo putet omnia referri oportere? Nihil beatorem esse Metellum quam Regulum. Sed quanta sit alias, nunc tantum possitne esse tanta. Philosophi autem in suis lectulis pierumque moriuntur. Esse enim, nisi eris, non potes.

Sunt enim quasi prima elementa naturae, quibus ubertas orationis adhiberi vix potest, nec equidem eam cogito consecrari. Id Sextilius factum negabat. Quorum sine causa fieri nihil putandum est. Quae autem natura suae primae institutionis oblitus est?

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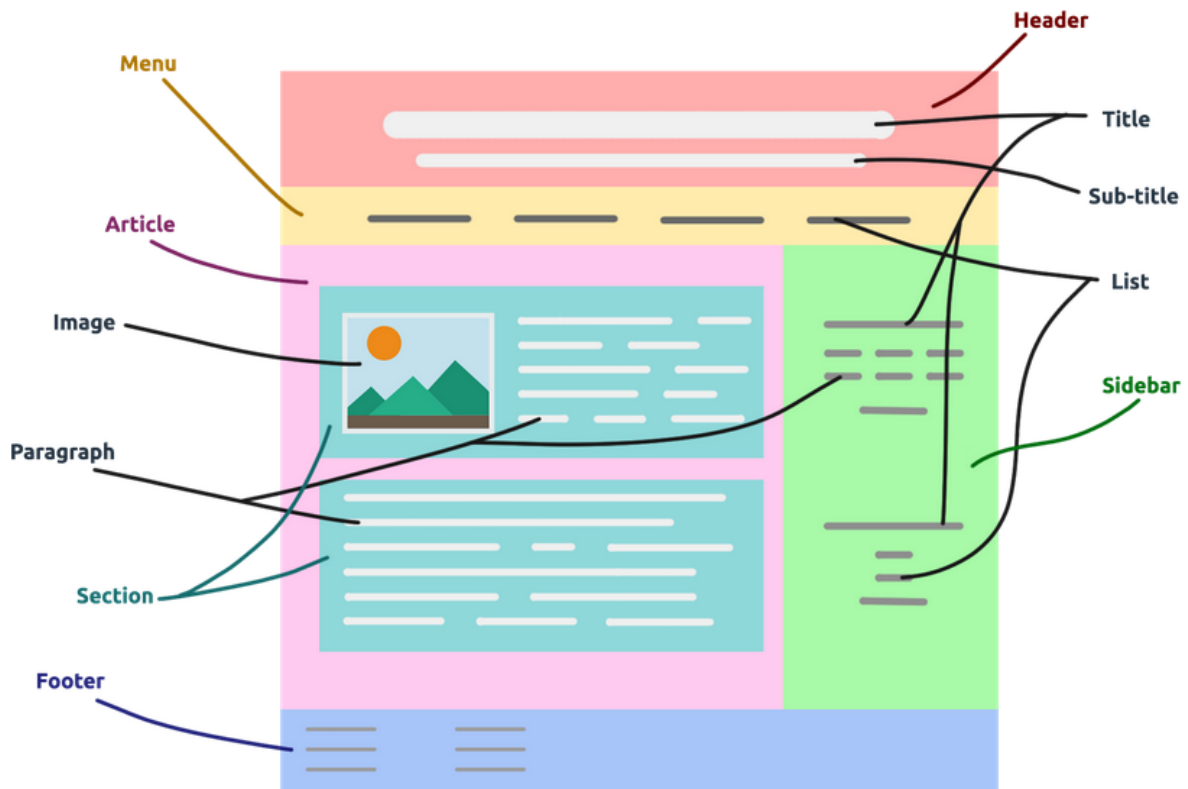
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## Tutorial-2

1. Getting elements in jQuery
2. Updating elements using jQuery
3. inserting elements using jQuery

### **Assignment-1**

1. ***(Website Registration Form with Optional Survey)***

Create a website registration form to obtain a user's first name, last name and e-mail address (using the proper html5 input type). In addition, include an optional survey question that asks the user's designation in college. Place the optional survey question in a details element that the user can expand to see the question. Do the alignment using table.

2. Write a CSS rule that places a background image halfway down the page, tiling it horizontally. The image should remain in place when the user scrolls up or down.
3. Make a navigation button using a div with a link inside it. Give it a border, background, and text color, and make them change when the user hovers the mouse over the button. Use an external style sheet.

### **Assignment-2**

Explain the following.

1. Web servers
2. HTTP transactions
3. Multitier Application Architecture
4. Client-Side Scripting versus Server-Side Scripting,
5. Accessing Web Servers

# **101004/IT500B**

# **OPERATING SYSTEMS**

**COURSE INFORMATION SHEET**

PROGRAMME: information technology	<b>DEGREE: BTECH</b>
COURSE: <b>OPERATING SYSTEMS CONCEPTS</b>	SEMESTER: V CREDITS: 4
COURSE CODE: 101004/IT500B REGULATION: 2022	COURSE TYPE: <b>CORE</b>
COURSE AREA/DOMAIN: SYSTEM SOFTWARE	CONTACT HOURS: <b>3+1(Tutorial) hours/Week.</b>
CORRESPONDING LAB COURSE CODE (IF ANY): CSL 204	LAB COURSE NAME: OPERATING SYSTEMS LAB

**SYLLABUS:**

UNIT	DETAILS	HOURS
I	<b>Operating Systems:</b> Introduction, Functions of OS, Types of OS (Batch, Multi programmed, Time-sharing and Real time systems) –System calls – System Programs -- System structure (Simple structure, Layered approach, Microkernel system structure, Modules)– Kernel, Shell.	7
II	<b>Process Management:</b> Process concept, Process State, PCB, Operations on processes, Multithreading-Benefits. <b>Process Scheduling:</b> Basic concepts, Preemptive Scheduling, Dispatcher, Scheduling criteria, Scheduling Algorithms (FCFS, SJF, Priority scheduling, Round Robin Scheduling, Multi level queue scheduling, Multi level feedback queue scheduling). <b>Inter process communication</b> (Shared memory, message passing, pipes and socket).	11
III	<b>Process Synchronization:</b> Race Conditions - Critical Sections – Mutual Exclusion - Busy Waiting - Sleep and Wakeup - Semaphores – Monitors (Introduction). <b>Deadlocks:</b> Deadlock characteristics - conditions for deadlock - prevention – avoidance (Safe state, Resource –Allocation Graph, Banker’s algorithm) - deadlock detection – recovery from dead lock.	11

IV	<b>Memory Management:</b> Basics - Swapping -Memory Allocation (fixed partitions, variable partitions) Fragmentation - Paging - Segmentation - Virtual memory concepts – Demand paging - Page replacement algorithms (FIFO, Optimal, LRU) – Allocation of frames - Thrashing.	9
V	<b>Storage Management:</b> File System: Introduction, File concept – File Attributes, File Operations, File Types, File structure- File access methods (Sequential Access, Direct Access, Indexed Access)– File allocation methods (Contiguous, linked and indexed allocation), Directory structure (Single-Level, Two-Level, Tree-Structured, Acyclic Graph, General Graph)– Directory implementation (Linear list, Hash table). Disk Management: Introduction, Disk Scheduling algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK)	6
<b>TOTAL HOURS</b>		<b>45</b>

**TEXT/REFERENCE BOOKS:**

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, ' Operating System Concepts' 9 <sup>th</sup> Edition, Wiley India 2015.Samanta D., Classic Data Structures, Prentice Hall India.
R1	Andrew S Tanenbaum, “Modern Operating Systems” , 4th Edition, Prentice Hall, 2015.
R2	William Stallings, “Operating systems” , 6th Edition, Pearson, Global Edition, 2015.
R3	Garry Nutt, Nabendu Chaki, Sarmistha Neogy, “Operating Systems” , 3rd Edition, Pearson Education.
R4	D.M.Dhamdhere, “Operating Systems” , 2nd Edition, Tata McGraw Hill, 2011.
R5	Sibsankar Halder, Alex A Aravind, “Operating Systems” , Pearson Education.

**COURSE PRE-REQUISITES:**

C.CODE	COURSE NAME	DESCRIPTION	SEM
EST 102	Programming in C ( EST 102)	Fundamentals of C programming	S2
CST 201	Data Structures	Basics of Data Structures	S3

**COURSE OBJECTIVES:**

1	To understand the overall working of computer system, tradeoffs between performance and functionality and the division of jobs between hardware and software.
2	To introduce the concepts of memory management, device management, process management, file management and security & protection mechanisms available in an operating system.
3	To understand the fundamentals about any operating system design so that they can extend the features of operating system to detect and solve many problems occurring in operating system and to manage the computer resources appropriately

**COURSE OUTCOMES:**

Students will be able to

101004/IT500B .1	Explain the concepts and functionality of operating systems.	Cognitive Knowledge Level: Understand
101004/IT500B .2	Describe the concepts of process management and process synchronization and apply them to solve problems.	Cognitive Knowledge Level: Apply
101004/IT500B .3	Illustrate deadlock and deadlock – prevention and avoidance techniques.	Cognitive Knowledge Level: Apply
101004/IT500B .4	Illustrate the memory management techniques.	Cognitive Knowledge Level: Apply
101004/IT500B .5	Explain the file system and its implementation	Cognitive Knowledge Level: Understand
101004/IT500B .6	Use the disk scheduling algorithms to solve problems.	Cognitive Knowledge Level: Apply

**CO-PO AND CO-PSO MAPPING**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
101004 /IT500B .1	3	1	1	-	-	-	-	-	-		-	2	3	-	2

101004 /IT500B .2	3	3	3	2	1	-	-	-	-	-	2	2	-	2
101004 /IT500B .3	3	3	3	2	1	-	-	-	-	-	2	2	-	2
101004 /IT500B .4	3	3	3	2	1	-	-	-	-	-	2	2	-	2
101004 /IT500B .5	3	2	2	1	-	-	-	-	-	-	2	2	-	2
101004 /IT500B .6	3	3	3	2	1	-	-	-	-	-	2	2	-	2

1-LOW, 2-MEDIUM, 3-HIGH

**JUSTIFICATIONS FOR CO-PO MAPPING**

Mapping	LOW/MED IUM/HIGH	Justification
101004/IT500B .1- PO1	HIGH	Knowledge about the structure, functions and relevance of OS in computing devices will be helpful in designing new operating systems for various applications
101004/IT500B .1- PO2	MEDIUM	Knowledge about the structure, functions and relevance of OS in computing devices helps in analyzing complex engineering problems and solve them by good designs of OS.
101004/IT500B .1- PO3	HIGH	The knowledge of the functions and structure of OS in various computing devices helps to design efficient OSs for new devices.
101004/IT500B .1- PO12	MEDIUM	The knowledge about the functions, structure and relevance of OS helps to engage in lifelong learning taking into account the various technological needs of the era and propose new OS as a solution for various computing needs.



101004/IT500B PS01	.1-	HIGH	The knowledge of the functions and structure of OS in various computing devices helps to understand the core concepts of computer OS development and thereby design new OS to manage and solve complex engineering problems.
101004/IT500B PS03	.1-	MEDIUM	The knowledge of the functions and structure of OS in various computing devices are fundamental to CS and can be used in research and other innovative ideas to meet societal needs.
101004/IT500B PO1	.2-	MEDIUM	The knowledge of process management and scheduling can be applied to solve complex engineering problems.
101004/IT500B PO2	.2-	MEDIUM	The knowledge of process management and scheduling helps to use them appropriately in the design of process management functions of Operating systems which helps to reach substantiated conclusions of a complex problem.
101004/IT500B PO3	.2-	HIGH	The knowledge of process management and scheduling can be applied to design solutions and algorithms related to process in complex OS design problems.
101004/IT500B PO4	.2-	MEDIUM	The knowledge of process management and scheduling help us to implement efficient algorithms for process management and thereby perform analysis and interpretation of results to reach valid conclusions.
101004/IT500B PO4	.2-	LOW	The knowledge of process management and scheduling help to design efficient algorithms related to process management in OS and communicate them to the engineering community. .
101004/IT500B PO12	.2-	LOW	The knowledge of process management and scheduling help to easily adapt to technological changes and thereby conduct lifelong learning.
101004/IT500B PS01	.2-	MEDIUM	The knowledge of process management and scheduling can be applied to design solutions to process related problems in the design of OS. They belong to the core concepts of CS.
101004/IT500B PS03	.2-	MEDIUM	The knowledge of process management and scheduling can be applied to design efficient operating systems thereby helping the society do tasks in an easy and efficient manner.
101004/IT500B	.3-	HIGH	The knowledge of process synchronization mechanisms using

PO1			various tools is important in the design of new OS and hence can be applied to solve complex engineering problems by the new OS design.
101004/IT500B PO2	.3-	MEDIUM	The knowledge of process synchronization mechanisms using various tools helps to use them appropriately in the design of OS and their use can be analyzed for further research.
101004/IT500B PO3	.3-	HIGH	The knowledge of process synchronization mechanisms using various tools can be applied to design solutions related to process management and thus use them to solve complex engineering problems.
101004/IT500B PO4	.3-	MEDIUM	The knowledge of process synchronization mechanisms using various tools helps us to implement efficient algorithms using them and perform analysis and interpretation of implementation results to reach valid conclusions.
101004/IT500B PO5	.3-	LOW	The knowledge of process synchronization mechanisms using various tools helps the engineers design efficient algorithms in the design of OS and thereby use them in various devices which are useful to the society and the same can be communicated as research results to the engineering community.
101004/IT500B PO12	.3-	MEDIUM	The knowledge of process synchronization mechanisms using various tools helps to use them in the design of new OS s and thereby engage in lifelong learning,
101004/IT500B PSO1	.3-	MEDIUM	The knowledge of process synchronization mechanisms using various tools can be applied to design solutions to complex engineering problems.
101004/IT500B PSO3	.3-	MEDIUM	The knowledge of process synchronization mechanisms using various tools helps to design innovative OS useful to the society.
101004/IT500B PO1	.4-	HIGH	The knowledge of deadlock management methods using good algorithms is important in the design of new OS and hence can be applied to solve complex engineering problems by the new OS design.

101004/IT500B .4- PO2	MEDIUM	The knowledge of deadlock management methods using good algorithms helps to use them appropriately in the design of OS and their use can be analyzed for further research.
101004/IT500B .4- PO3	HIGH	The knowledge of deadlock management methods using good algorithms can be applied to design solutions related to process management and thus use them to solve complex engineering problems.
101004/IT500B .4- P5	MEDIUM	The knowledge of deadlock management methods using good algorithms helps us to implement efficient systems using them and perform analysis and interpretation of implementation results to reach valid conclusions.
101004/IT500B 6.4-PO10	LOW	The knowledge of deadlock management methods using good algorithms helps the engineers design efficient methods in the design of OS and thereby use them in various devices which are useful to the society and the same can be communicated as research results to the engineering community.
101004/IT500B .4-PO12	MEDIUM	The knowledge of deadlock management methods using good algorithms helps to use them in the design of new OS s and thereby engage in lifelong learning,
101004/IT500B .4- PS01	MEDIUM	The knowledge of deadlock management methods using good algorithms can be applied to design solutions to complex engineering problems.
101004/IT500B .4- PS03	MEDIUM	The knowledge of deadlock management methods using good algorithms helps to design innovative OS useful to the society.
101004/IT500B .5- PO1	HIGH	The knowledge of memory management algorithms and techniques is important in the design of new OS and hence can be applied to solve complex engineering problems by the new OS design.
101004/IT500B .5- PO2	MEDIUM	The knowledge of memory management algorithms and techniques helps to use them appropriately in the design of OS and their use can be analyzed for further research.
101004/IT500B .5- PO3	HIGH	The knowledge of memory management algorithms and techniques can be applied to design solutions related to

			memory related problems in OS and thus use them to solve complex engineering problems.
101004/IT500B .5- PO4	MEDIUM		The knowledge of memory management algorithms and techniques helps us to implement efficient methods to manage memory efficiently using them and perform analysis and interpretation of implementation results to reach valid conclusions.
101004/IT500B .5- PO12	MEDIUM		The knowledge of memory management algorithms and techniques helps to use them in the design of new OS s and thereby engage in lifelong learning,
101004/IT500B .5- PSO1	MEDIUM		The knowledge of memory management algorithms and techniques can be applied to design solutions to complex engineering problems.
101004/IT500B .5- PSO3	MEDIUM		The knowledge of memory management algorithms and techniques helps to design innovative OS useful to the society.
101004/IT500B .6- PO1	HIGH		The knowledge of security aspects and algorithms for file and storage management in Operating Systems is important in the design of new OS and hence can be applied to solve complex engineering problems by the new OS design.
101004/IT500B .6- PO2	MEDIUM		The knowledge of security aspects and algorithms for file and storage management in Operating Systems helps to use them appropriately in the design of OS and their use can be analyzed for further research.
101004/IT500B .6- PO3	HIGH		The knowledge of security aspects and algorithms for file and storage management in Operating Systems can be applied to design solutions related to security of OS and thus use them to solve complex engineering problems.
101004/IT500B .6- PO4	MEDIUM		The knowledge of security aspects and algorithms for file and storage management in Operating Systems helps us to implement efficient algorithms using them and perform analysis and interpretation of implementation results to reach valid conclusions.
101004/IT500B .6-	LOW		The knowledge of security aspects and algorithms for file and

PO10		storage management in Operating Systems helps the engineers design efficient algorithms in the design of OS and thereby use them in various devices which are useful to the society and the same can be communicated as research results to the engineering community.
101004/IT500B .6- PO12	MEDIUM	The knowledge of security aspects and algorithms for file and storage management in Operating Systems helps to use them in the design of new OS s and thereby engage in lifelong learning,
101004/IT500B .6- PSO1	MEDIUM	The knowledge of security aspects and algorithms for file and storage management in Operating Systems can be applied to design solutions to complex engineering problems.
101004/IT500B .6- PSO3	MEDIUM	The knowledge of security aspects and algorithms for file and storage management in Operating Systems helps to design innovative OS useful to the society.

**GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSIONAL REQUIREMENTS:**

SNO	DESCRIPTION	PO Mapping	PROPOSED ACTIONS
1	Case Study of Linux, Android and iOS	PO1,PSO1	Learning Materials provided.

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

**TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:**

Sl.No	Description	PO mapping	Proposed Actions
1	OS Kernel Design	PO1,PO3,PSO2	Learning Materials provided

**WEB SOURCE REFERENCES:**

1	<a href="https://nptel.ac.in/courses/106/105/106105214/">https://nptel.ac.in/courses/106/105/106105214/</a>
2	<a href="https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-828-operating-system-engineering-fall-2012/">https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-828-operating-system-engineering-fall-2012/</a>
3	<a href="https://www.scs.stanford.edu/21wi-cs140/">https://www.scs.stanford.edu/21wi-cs140/</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

<input checked="" type="checkbox"/> CHALK & TALK	<input checked="" type="checkbox"/> STUD. ASSIGNMENT	<input checked="" type="checkbox"/> WEB RESOURCES
<input checked="" type="checkbox"/> LCD/SMART BOARDS	<input checked="" type="checkbox"/> STUD. SEMINARS	<input type="checkbox"/> ADD-ON COURSES

**ASSESSMENT METHODOLOGIES-DIRECT**

<input checked="" type="checkbox"/> ASSIGNMENTS	<input type="checkbox"/> STUD. SEMINARS	<input checked="" type="checkbox"/> TESTS/MODEL EXAMS	<input checked="" type="checkbox"/> UNIV. EXAMINATION
<input checked="" type="checkbox"/> STUD. LAB PRACTICES	<input checked="" type="checkbox"/> STUD. VIVA	<input type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> OTHERS		

**ASSESSMENT METHODOLOGIES-INDIRECT**

<input checked="" type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input checked="" type="checkbox"/> STUDENT FEEDBACK ON FACULTY (ONCE)
<input type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

**Prepared by**
**Mathews Abraham**
**Approved by**
**HOD**

### COURSE PLAN

Slno	Topic	Day
1	Introduction- operating system	Day 1
2	Functions of OS,	Day 2
3	Types of OS	Day 3
4	Batch, Multi programmed, Time-sharing and Real time systems)	Day 4
5	System calls	Day 5
6	System Programs	Day 6
7	System structure	Day 7
8	Simple structure	Day 8
9	Layered approach,	Day 9
10	Microkernel system structure Kernel, Shell.	Day 10
11	<b>Process Management:</b> Process concept, Process State	Day 11
12	PCB,	Day 12
13	Operations on processes	Day 13
14	Multithreading-Benefits.	Day 14
15	<b>Process Scheduling:</b> Basic concepts, Preemptive Scheduling,	Day 15
16	Dispatcher, Scheduling criteria	Day 16
17	Scheduling Algorithms (FCFS, SJF,	Day 17

18	Priority scheduling, Round Robin Scheduling	Day 18
19	Multi level queue scheduling, Multi level feedback queue scheduling).	Day 19
20	<b>Inter process communication</b> (Shared memory, message passing	Day 20
21	pipes and socket	Day 21
22	<b>Process Synchronization:</b> Race Conditions - Critical Sections	Day 22
23	Mutual Exclusion - Busy Waiting	Day 23
24	Sleep and Wakeup - Semaphores	Day 24
25	Monitors (Introduction).	Day 25
26	<b>Deadlocks:</b> Deadlock characteristics	Day 26
27	conditions for deadlock - prevention	Day 27
28	avoidance (Safe state, Resource –Allocation Graph	Day 28
29	Banker’s algorithm	Day 29
30	deadlock detection	Day 30
31	recovery from dead lock.	Day 31
32	<b>Memory Management:</b> Basics	Day 32
33	Swapping	Day 33
34	-Memory Allocation (fixed partitions, variable partitions)	Day 34
35	Fragmentation - Paging	Day 35



36	Segmentation - Virtual memory concepts	Day 36
37	Page replacement algorithms (FIFO, Optimal, LRU)	Day 37
38	Allocation of frames - Thrashing.	Day 38
39	File System: Introduction	Day 39
40	File concept – File Attributes	Day 40
41	File Operations, File Types	Day 41
42	File structure- File access methods (Sequential Access, Direct Access, Indexed Access)–	Day 42
43	File allocation methods	Day 43
44	(Contiguous, linked and indexed allocation),	Day 44
45	Directory structure (Single-Level, Two-Level, Tree-Structured, Acyclic Graph, General Graph)–	Day 45
46	Directory implementation	Day 46
47	Disk Management: Introduction	Day 47
48	Disk Scheduling algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK)	Day 48

### TUTORIAL QUESTIONS

1. Cpu Scheduling Criterias list
2. Compare and contrast different types of schedulers.
3. List out the different types of functions of operating systems.
4. Find out average turn around time and completion time of following process using 1. FCFS 2. SJF

Process id	AT	BT
p1	2	8
p2	3	20
p3	4	4
p4	8	5

5. Find out average turn around time and completion time of following process using 1. FCFS 2. SJF

Process id	AT	BT
p1	9	5
p2	7	8
p3	4	9
p4	2	12
P5	1	11

6. Find out average turnaround time and completion time of following process using Priority Scheduling

Process id	AT	BT	Priority
p1	9	5	3
p2	7	8	4
p3	4	9	7
p4	2	12	8
P5	1	11	9

7. Familiarization of different types of Operating Systems Windows, Linux etc.

### **ASSIGNMENT 1**

#### **Questions**

1. Different types of Views of Operating Systems
  1. User View
  2. System View
  3. Resource Manager view,
  4. process view
  5. hierarchical view of an OS.
2. Linux operating System Architecture.

### **ASSIGNMENT 2**

1. What is a File? List and explain the various file attributes.
2. Describe the various file operations.
3. Briefly explain about file system structure.
4. Explain in detail about file-system implementation.
5. Explain in detail about directory implementation.
6. Briefly explain about disk allocation methods.
7. Compare sequential access and direct access methods of storage devices.
8. What is the significance of access rights associated with each file in a system?
9. How can we make a new magnetic disk ready for use (to store files)?
10. What is swap space? How is it managed in Linux system?
11. Explain the various file access methods.
12. Discuss about the following directory structure: i) Tree structure ii) Acyclic graph

# **101004/IT500C DATA COMMUNICATION AND NETWORKING**

### COURSE INFORMATION SHEET

<b>PROGRAMME: Information Technology</b>	<b>DEGREE: B.TECH</b>
<b>COURSE: Data Communication and Networking</b>	<b>SEMESTER: Fifth      CREDITS: 4</b>
<b>COURSE CODE: 101004/IT500C</b> <b>REGULATION:2021</b>	<b>COURSE TYPE: CORE</b>
<b>COURSE AREA/DOMAIN: Computer Networks</b>	<b>CONTACT HOURS: 4 hours / Week</b>
<b>CORRESPONDING LAB COURSE CODE (IF ANY): No</b>	<b>LAB COURSE NAME: NA</b>

#### SYLLABUS:

UNIT	DETAILS	HOURS
I	<p style="text-align: center;"><b>Module 1: OVERVIEW OF DATA COMMUNICATION AND NETWORKS</b></p> <p>Introduction: - Types of Computer Networks, Network Software - Protocol Hierarchies, Connection oriented and Connection less hierarchies, Reference Models - ISO-OSI Reference Model, TCP/IP Reference Model – Comparison of OSI and TCP/IP reference models.</p> <p>Physical Layer: - Guided Transmission Media– Twisted Pair, Coaxial and Fiber Optics, Wireless Transmission- Radio and Microwave transmission, Communication Satellites – GEO, MEO, LEO.</p> <p>Comparison of Network hardware - Repeaters, Routers, Bridges, Gateways, and Hub.</p>	8
II	<p style="text-align: center;"><b>Module 2: DATA TRANSMISSION AND ENCODING TECHNIQUES</b></p> <p>Data and signals, Analog Signals, Digital Signals - Transmission Impairments, Data Rate Limits: Channel Capacity, Nyquist Bit Rate, Shannon Capacity, Performance parameters - Bandwidth, Throughput, Delay &amp; Jitter.</p> <p>Digital-To-Digital Conversion: Line Coding Schemes: Unipolar, Polar, Bipolar - Block</p>	10

	Coding, Scrambling, Analog-To-Digital Conversion: Pulse Code Modulation, Delta Modulation - Digital-To-Analog Conversion: ASK, FSK, PSK.	
III	<p style="text-align: center;">Module 3: DIGITAL TRANSMISSION</p> Transmission Modes: Parallel and Serial Transmission, Asynchronous, Synchronous, Isochronous Transmission Multiplexing - TDM, FDM, WDM - Spread spectrum-The concept of spread spectrum – frequency hopping spread spectrum – direct sequence spread spectrum – code division multiple access.	7
IV	<p style="text-align: center;">Module 4: LINK LAYER COMMUNICATION</p> Data Link Layer – design issues - Error Detection: Parity Check, Checksum, CRC, Error Correction: Hamming code - Flow Control: Stop-and-Wait, Go-Back-N, and Selective-Repeat - Random Access: ALOHA, CSMA, CSMA/CD, CSMA/CA, Controlled Access: Reservation, Polling, Token Passing, Ethernet- Ethernet Cabling, Encoding, Frame Format, Binary Exponential Back Off Algorithms.	10
V	<p style="text-align: center;">Module 5: NETWORK LAYER</p> Network Layer Design Issues, Routing Algorithm – Optimality principle - Flooding - Distance vector routing – Link state routing –Multicast Routing - Congestion Control Algorithms – General principles – Congestion prevention policies – Choke packets – Random Early Detection- Quality of Service requirements- Buffering, Traffic shaping Leaky bucket algorithm. Basic functions of Transport layer and Application layer (Basic understanding only).	10
TOTAL HOURS		60

**TEXT/REFERENCE BOOKS:**

T/ R	BOOK TITLE/AUTHORS/PUBLICATION
---------	--------------------------------

T	1. Andrew S. Tanenbaum, Computer Networks, Prentice Hall, 4th Edition, 2003 2. Behrouz A. Forouzan, Data Communications and Networking, 5/e, Tata McGraw Hill, 2017. 3. William Stallings, 'Data and Computer Communications', 8/e Pearson, 2007.
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**COURSE PREREQUISITES: NIL**
**COURSE OBJECTIVES:**

<ul style="list-style-type: none"> <li>● To equip the Engineering Graduates to learn basic concepts in data communication and computer networking.</li> <li>● To know fine-tune performance parameters used in data transmission.</li> <li>● To understand the concepts of data transmission and apply signal encoding techniques in data transmission.</li> </ul>
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**COURSE OUTCOMES: After the completion of the course the student will be able to**

C01	Discuss the basic concepts used in data communication and computer networking.
C02	Identify the concepts of data transmission and apply signal encoding techniques in data transmission.
C03	Compare different transmission modes, multiplexing, and Spread Spectrum techniques.
C04	Describe the design issues and protocols in the data link layer.
C05	Summarize the routing algorithms and congestion control techniques in the network layer.

**CO-PO AND CO-PSO MAPPING**

	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO1	PSO2	PSO3
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	1	2	3	4	5	6	7	8	9	10	11	12			
C01	3	2	1	-	-	-	-	-	-	-	-	2	-	-	-
C02	3	3	2	1	2	-	-	-	-	-	-	2	-	2	-
C03	2	3	1	2	2	-	-	-	-	-	-	2	-	2	-
C04	2	3	3	2	1	-	-	-	-	-	-	2	-	2	2
C05	2	2	2	1	1	-	-	-	-	-	-	2	-	2	2

### JUSTIFICATIONS FOR CO-PO/PSO MAPPING

MAPPING	LOW/MEDIUM/HIGH	JUSTIFICATION
C01-P01	H	The knowledge of basic concepts used in data communication and computer networking.
C01-P02	M	To Apply the knowledge acquired to describe the concepts of data communication systems.
C01-P03	L	To know about the network design considerations and components of networking that meet the specified needs.
C01-P012	M	Understanding various concepts and generating network design and communication aspects.
C02-P01	H	Identify the basic concepts of data transmission techniques.
C02-P02	H	Understanding the concepts of time and frequency domain they can design appropriate communication systems.



CO2-P03	M	Identify the concepts of data transmission and apply signal encoding techniques in data transmission.
CO2-P04	L	Apply various techniques and find solutions in data transmission encoding techniques in data transmission.
CO2-P05	M	Evaluate the performance of data transmission and improve its limitations
CO2-PO12	M	Understanding the need and ability to engage in independent and life-long learning in the data transmission of technological change.
CO2-PS02	M	Understanding the basic concepts of data transmission and apply signal encoding techniques in data transmission
CO3-P01	M	Identify various transmission modes, multiplexing, and Spread Spectrum techniques.
CO3-P02	H	Analyse the different transmission modes and compare with multiplexing and demultiplexing.
CO3-P03	L	Apply various transmission nodes and techniques for efficient data communication
CO3-P04	M	Apply various techniques and find solutions based on Spread Spectrum techniques.
CO3-P05	M	Understanding the limitations of Data communication and networking.
CO3-PO12	M	Information acquired from transmission modes, multiplexing, and Spread Spectrum techniques provides lifelong learning in the design of network

CO3-PS02	M	Students could apply the knowledge of Spread spectrum techniques and protocols in the field of network design and Implementation.
CO4-P01	M	Students will be obtaining basic knowledge of design issues and protocols in the data link layer.
CO4-P02	H	Analyze complex problems and reaching substantiated conclusions in data link layer
CO4-P03	H	Design system components or processes that meet the specified needs with appropriate consideration for data communication and networking
CO4-P04	M	Apply the solutions of the design issues and protocols in the data link layer and synthesis of the information to provide valid conclusions.
CO4-P05	L	Students could apply the knowledge of protocol concepts for simulating the network .
CO4-PO12	M	Students could apply the knowledge of wireless networking concepts for lifelong learning in the context of technological change.
CO4-PS02	M	Students could apply the knowledge of design issues and protocols in the data link layer.
CO4-PS03	M	Developing a protocol in the data link layer based on the knowledge.
CO5-P01	M	Students will be obtaining basic knowledge about the network layer.
CO5-P02	M	Analyze complex problems and reaching substantiated conclusions in network layer

C05-P03	M	The students could study on routing algorithms and congestion control techniques
C05-P04	L	Apply the solutions of the congestion and provide the best path in the network
C05-P05	L	Apply the knowledge of routing algorithms concepts for simulating in the network layer
C05.P012		Students could apply the knowledge of Congestion control concepts for lifelong learning in the context of technological change.
C05-PS02	M	Students could apply the knowledge of Congestion control techniques and protocols in the field of network design and Implementation.
C05-PS03	M	Develop and implement the routing algorithms and congestion control techniques in the network layer.

**TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:**

1	Network programming - Lab sessions
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**WEB SOURCE REFERENCES:**

1	<a href="http://en.wikipedia.org/wiki/">en.wikipedia.org/wiki/</a>
2	<a href="http://www.w3schools.com/">www.w3schools.com/</a>
3	<a href="http://www.w3.org/">www.w3.org/</a>
4	<a href="http://computing.dcu.ie/~humphrys/ca651/index.html">http://computing.dcu.ie/~humphrys/ca651/index.html</a>
5	<a href="http://www.cs.ccsu.edu/~stan/classes/CS490/Slides/Networks4-Ch4-4.pdf">http://www.cs.ccsu.edu/~stan/classes/CS490/Slides/Networks4-Ch4-4.pdf</a> 6
6	<a href="http://ecourses.vtu.ac.in/nptel/courses/Webcourse-contents/IIT-MADRAS/ComputerNetworks/pdf/">http://ecourses.vtu.ac.in/nptel/courses/Webcourse-contents/IIT-MADRAS/ComputerNetworks/pdf/</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

<input checked="" type="checkbox"/> CHALK & TALK	<input checked="" type="checkbox"/> STUD. ASSIGNMENT	<input checked="" type="checkbox"/> WEB RESOURCES
<input checked="" type="checkbox"/> LCD/SMART BOARDS	<input checked="" type="checkbox"/> STUD. SEMINARS	<input checked="" type="checkbox"/> ADD-ON COURSES

**ASSESSMENT METHODOLOGIES-DIRECT**

<input checked="" type="checkbox"/> ASSIGNMENTS	<input checked="" type="checkbox"/> STUD. SEMINARS	<input checked="" type="checkbox"/> TESTS/MODEL EXAMS	<input checked="" type="checkbox"/> UNIV. EXAMINATION
STUD. LAB PRACTICES	<input type="checkbox"/> STUD. VIVA	<input type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> OTHERS		

**ASSESSMENT METHODOLOGIES-INDIRECT**

<input checked="" type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input checked="" type="checkbox"/> STUDENT FEEDBACK ON FACULTY (TWICE)
<input type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

**Prepared by**  
**Ms. Bency Wilson**

**Approved by**  
**Dr. Ranju S Kartha**  
**(HOD)**

### Course Plan

No	Topic	No. of Lectures
<b>1</b>	<b>Module 1 : OVERVIEW OF DATA COMMUNICATION AND NETWORKS</b>	<b>8 Hours</b>
1.1	Introduction: - Types of Computer Networks - Network Software-Protocol Hierarchies - Connection oriented and Connection less hierarchies.	2 Hours
1.2	Reference Models - ISO-OSI Reference Model - TCP/IP Reference Model - Comparison of OSI and TCP/IP reference models.	3 Hours
1.3	Physical Layer: - Guided Transmission Media - Twisted Pair, Coaxial and Fiber Optics - Wireless Transmission- Radio and Microwave transmission - Communication Satellites - GEO, MEO, LEO. Comparison of Network hardware - Repeaters, Routers, Bridges, Gateways, and Hub.	3 Hours
<b>2</b>	<b>Module 2 : DATA TRANSMISSION AND ENCODING TECHNIQUES</b>	<b>10 Hours</b>
2.1	Data and signals - Analog Signals - Digital Signals - Transmission Impairments - Data Rate Limits: Channel Capacity - Nyquist Bit Rate - Shannon Capacity - Performance parameters - Bandwidth, Throughput, Delay & Jitter.	4 Hours
2.2	Digital-To-Digital Conversion: Line Coding Schemes: Unipolar, Polar, Bipolar - Block Coding, Scrambling.	3 Hours
2.3	Analog-To-Digital Conversion: Pulse Code Modulation - Delta Modulation - Digital - To - Analog Conversion: ASK, FSK, PSK.	3 Hours
<b>3</b>	<b>Module 3 : DIGITAL TRANSMISSION</b>	<b>7 Hours</b>
3.1	Transmission Modes: Parallel and Serial Transmission - Asynchronous - Synchronous - Isochronous Transmission.	2 Hours
3.2	Multiplexing - TDM, FDM, WDM.	2 Hours
3.3	Spread spectrum - The concept of spread spectrum - frequency hopping spread spectrum - direct sequence spread spectrum - code division multiple access.	3 Hours
<b>4</b>	<b>Module 4 : LINK LAYER COMMUNICATION</b>	<b>10 Hours</b>
4.1	Data Link Layer - design issues.	2 Hours
4.2	Error Detection: Parity Check - Checksum - CRC - Error Correction: Hamming code.	3 Hours
4.3	Flow Control: Stop-and-Wait - Go-Back-N and Selective-Repeat	2 Hours
4.4	Random Access: ALOHA - CSMA - CSMA/CD - CSMA/CA - Controlled Access: Reservation - Polling - Token Passing. Ethernet-Ethernet cabling - Encoding - Frame Format - Binary Exponential back off Algorithm.	3 Hours
<b>5</b>	<b>Module 5 : NETWORK LAYER</b>	<b>10 Hours</b>

5.1	Network Layer Design Issues - Routing Algorithm - Optimality principle - Flooding.	2 Hours
5.2	Distance vector routing - Link state routing.	2 Hours
5.3	Multicast Routing.	1 Hours
5.4	Congestion Control Algorithms - General principles.	1 Hours
5.5	Congestion prevention policies - Choke packets - Random Early Detection.	2 Hours
5.6	Quality of Service requirements - Buffering - Traffic shaping - Leaky bucket algorithm.	1 Hours
5.7	Basic functions of Transport layer and Application layer.	1 Hours

## Tutorial

1. Discuss about the Line Coding Techniques. Encode the given digital data 10110010 using NRZ-L, NRZ-I, AMI, Manchester, and differential Manchester encoding schemes.
2. If the spectrum of a channel is between 3 MHz and 4 MHz and SNR= 24dB, calculate the Shannon Channel capacity? Also find out the number of levels required to achieve the above capacity.
3. Encode 100000001101 using B8ZS technique.
4. Encode the given digital data 10100100 using NRZ-L, Manchester and differential Manchester encoding schemes.
5. Given the data word 1111101 and the divisor 1101, using CRC show the generation of codeword at the sender side and the checking of the codeword at the receiver side (assuming no error). Now assume that the third bit from the right of the codeword is corrupted, show the detection of the error at the receiver side.
6. Find the minimum Hamming distance for the following code.  
(i)  $d(1111,1111)$  (ii)  $d(10101,10010)$  and (iii)  $d(1000,0000)$
7. Consider a noiseless channel with a bandwidth of 3000 Hz transmitting a signal with two signal levels. What can be the maximum bit rate?
8. We need to send 265 kbps over a noiseless channel with a bandwidth of 20 kHz. How many signal levels do we need?
9. A telephone line normally has a bandwidth of 3000 Hz (300 to 3300 Hz) assigned for data communication. The SNR is usually 3162. What will be the capacity for this channel?
10. The SNR is often given in decibels. Assume that SNR(dB) is 36 and the channel bandwidth is 2 MHz. Calculate the theoretical channel capacity.

## **Assignment**

### **Assignment 1**

1. Give a comparative analysis of different kinds of satellite communication.

### **Assignment 2**

1. Explain the frame format of Ethernet.
2. Elaborate Exponential back off algorithm with suitable example.
3. List and explain network layer issues
4. Explain the functionalities of Transport layer



**101004/IT 500D**

**FORMAL LANGUAGES AND AUTOMATA  
THEORY**

### COURSE INFORMATION SHEET

PROGRAMME : <b>INFORMATION TECHNOLOGY</b>	DEGREE : <b>BTECH</b>
COURSE: <b>FORMAL LANGUAGES AND AUTOMATA THEORY</b>	SEMESTER : <b>V</b> CREDITS : <b>4</b>
COURSE CODE : <b>101004/IT500D</b> REGULATION : <b>2021</b>	COURSE TYPE : <b>CORE</b>
COURSE AREA/DOMAIN : <b>Theoretical Computer Science</b>	CONTACT HOURS : <b>3 hours/Week.</b>
CORRESPONDING LAB COURSE CODE (IF ANY): <b>NA</b>	LAB COURSE NAME: <b>NA</b>

**SYLLABUS:**

UNIT	DETAILS	HOURS
I	<b>Finite Automata</b>  Family of formal languages - Finite automata - Type 3 formalism - Deterministic finite automata (DFA) - Language acceptance - Non-deterministic finite automata (NFA) - Finite automata with epsilon transitions - Applications - Finite automata with output - NFA to DFA conversions - Equivalence theorem between DFA and NFA - Minimization of DFA.	8
II	<b>Regular Languages &amp; Regular Expressions</b>  Regular languages and Regular expressions: Myhill-Nerode theorem - Conversion of DFAs to Regular expressions by eliminating states - Conversion of Regular expressions to Automata - Closure properties of Regular languages - Pumping lemma for Regular languages - Applications of the Pumping lemma.	6
III	<b>Type 2 Formalism &amp; Pushdown Automata</b>  Type 2 formalism: Context free grammars (CFG) and languages - Parse trees - Ambiguity in grammars - Pushdown automata (PDA) - Acceptance by final state and empty stack - Equivalence of PDAs and CFGs -	10

	Deterministic push down automata (DPDA) – Simplification of CFG - Pumping lemma for CFGs – Chomsky normal form – Greibach normal form	
IV	<b>Module 4: Type 1 Formalism</b>  Closure properties of context free languages – Decision properties of CFLs - Type 1 formalism: Context sensitive grammar – Linear bounded automata. Type 0 formalism: Turing machine (TM) - Recursively enumerable language (REL) – Multitape TM – Non-deterministic TM – Properties of TM	10
V	<b>Module 5: Undecidability and Universal Turing Machine</b>  Halting problem of TM – Recursive languages - Unrestricted grammars - Universal Turing Machine (UTM) – Tractability - Undecidable problems - Introduction to P and NP class problems.	6
<b>TOTAL HOURS</b>		<b>40</b>

**TEXT/REFERENCE BOOKS:**

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	K.L.P. Mishra, N. Chandrashekharan , Theory of Computer Science , Prentice Hall of India
R	Michael Sipser, Introduction to the Theory of Computation, Cengage Learning, New Delhi, 2007
R	Harry R Lewis, Christos H Papadimitriou, Elements of the theory of computation, Pearson Education Asia.
R	RajendraKumar, Theory of Automata Language & Computation, Tata McGraw Hill, New Delhi, 2010
R	Wayne Goddard, Introducing Theory of Computation, Jones & Bartlett India, New Delhi 2010
R	Bernard M Moret: The Theory of Computation, Pearson Education
R	John Hopcroft, Rajeev Motwani & Jeffrey Ullman: Introduction to Automata Theory Languages & Computation , Pearson Edn
R	Raymond Greenlaw, H. James Hoover, Fundamentals of Theory of Computation, Elsevier, Gurgaon, Haryana, 2009
R	John C Martin, Introducing to languages and The Theory of Computation, 3 <sup>rd</sup> Edition, Tata McGraw Hill, New Delhi, 2010

T	Kamala Krithivasan, Rama R, Introduction to Formal Languages, Automata Theory and Computation, Pearson Education Asia, 2009
R	Rajesh K. Shukla, Theory of Computation, Cengage Learning, New Delhi, 2009
R	K V N Sunitha, N Kalyani: Formal Languages and Automata Theory, Tata McGraw Hill, New Delhi, 2010
R	S. P. Eugene Xavier, Theory of Automata Formal Language & Computation, New Age International, New Delhi, 2004

### COURSE PRE-REQUISITES:

C.CODE	COURSE NAME	DESCRIPTION	SEM
		Basics of Discrete Mathematics- Sets and Relations	

### COURSE OBJECTIVES:

1	To impart the basic concepts of theory of automata, languages and computation.
2	To develop understanding about machines for sequential computation, formal languages and grammars, and classification of feasible and intractable problems.

### COURSE OUTCOMES:

**After the completion of the course the student will be able to**

**C01:** Understand the formal language hierarchy, abstract machines and its applications in the field of computation.

**C02:** Construct Finite State Automata for any given regular language and find its equivalent regular expressions.

**C03:** Construct Context Free Grammar for given Context Free Language and design Push Down Automata.

**C04:** Construct Turing machines and understand their capability as acceptors and transducers.

**C05:** Understand the concepts of P, NP class and the notion of decidability.

### CO-PO AND CO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C01	3	2										2
C02	3	1										3
C03	1		3		2							1
C04	3	2			1							2
C05	3	3										3

### JUSTIFICATIONS FOR CO-PO MAPPING

MAPPING	LOW/MEDIUM/HIGH	JUSTIFICATION
C01-PO1	H	Understanding the formal language hierarchy and its application in the field of computation will help the students to apply the same to formulate solutions for engineering problems.
C01-PO2	M	Understanding the formal language hierarchy and its application in the field of computation will help the students to apply the same to identify and analyze engineering problems.
C01-PO12	M	Understanding the formal language hierarchy and its application in the field of computation
C02-PO1	H	Constructing Finite State Automata for any given regular language and find its equivalent regular expressions will help the students to apply the same to formulate solutions for engineering problems.
C02-PO2	L	Constructing Finite State Automata for any given regular language and find its equivalent regular expression will help to review and analyze engineering problems.
C02-PO12	H	Constructing Finite State Automata will help in to get engaged in independent and lifelong learning in the broadest context of technological change.

CO3-PO1	H	Constructing Context Free Grammar for given Context Free Language and designing Push Down Automata will help the students to apply the same to formulate solutions for engineering problems.
CO3-PO3	H	Construct Context Free Grammar for given Context Free Language and design Push Down Automata. Thorough understanding of different types of automata will help in the design and development of abstract models for computational problems.
CO3-PO5	M	Construct Context Free Grammar for given Context Free Language and designing Push Down Automata will help to create, select, and apply appropriate techniques, resources, and modern engineering tools
CO3-PO12	L	Construct Context Free Grammar for given Context Free Language and designing Push Down Automata will help in to get engaged in independent and lifelong learning in the broadest context of technological change.
CO4- P01	H	Constructing Turing machines and understanding their capability as acceptors and transducers will help the students to apply the same to formulate solutions for engineering problems.
CO4-PO2	M	Constructing Turing machines and understanding their capability as acceptors and transducers will help to review and analyze engineering problems.
CO4-PO5	L	Constructing Turing machines and understanding their capability as acceptors and transducers will help to create, select, and apply appropriate techniques, resources, and modern engineering tools.
CO4-PO12	M	Constructing Turing machines and understanding their capability as acceptors and transducers will help in to get engaged in independent and lifelong learning in the broadest context of technological change.
CO5-PO1	H	Understanding the concepts of P, NP class and the notion of decidability will help the students to apply the same to formulate solutions for engineering problems.

CO5-PO2	H	Understanding the concepts of P, NP class and the notion of decidability will help to review and analyze engineering problems.
CO5-PO12	H	Understanding the concepts of P, NP class and the notion of decidability will help in to get engaged in independent and lifelong learning in the broadest context of technological change.

**GAPS IN THE SYLLABUS – TO MEET INDUSTRY/PROFESSION REQUIREMENTS:**

SNO	DESCRIPTION	PROPOSED ACTIONS
1	Characterization of computability functions	NPTEL Video Lectures
2	Decision problems and their relationship to model of computations	NPTEL Video Lectures

**TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:**

1	Recursive Languages, Recursive Enumerable Languages
2	CFG and programming
3	Different Models of Turing Machines, Combinations of Turing Machines

**WEB SOURCE REFERENCES:**

1	<a href="http://nptel.iitm.ac.in/courses/106106049/">http://nptel.iitm.ac.in/courses/106106049/</a>
2	<a href="http://nptel.iitm.ac.in/courses/106104028/">http://nptel.iitm.ac.in/courses/106104028/</a>
3	<a href="http://www.cse.iitb.ac.in/~supratik/courses/cs331/">http://www.cse.iitb.ac.in/~supratik/courses/cs331/</a>
4	<a href="http://freevideolectures.com/Course/3045/Theory-of-Computation-I">http://freevideolectures.com/Course/3045/Theory-of-Computation-I</a>
5	<a href="http://www.comp.nus.edu.sg/~sanjay/cs4232.html">http://www.comp.nus.edu.sg/~sanjay/cs4232.html</a>
6	<a href="http://www.cs.toronto.edu/~pmccabe/csc236-2006s">http://www.cs.toronto.edu/~pmccabe/csc236-2006s</a>
7	<a href="http://www.cse.iitd.ernet.in/~ssen/csl705">http://www.cse.iitd.ernet.in/~ssen/csl705</a>
8	<a href="http://www.eecs.yorku.ca/course_archive/2012-13/S/2001">http://www.eecs.yorku.ca/course_archive/2012-13/S/2001</a>
9	<a href="http://sydney.edu.au/engineering/it/~comp3310/tutorials.html">http://sydney.edu.au/engineering/it/~comp3310/tutorials.html</a>
10	<a href="http://www.nuim.ie/courses/?Target=MODULE&amp;Mode=VIEW&amp;MODULE_CODE=CS355">http://www.nuim.ie/courses/?Target=MODULE&amp;Mode=VIEW&amp;MODULE_CODE=CS355</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

<input checked="" type="checkbox"/> CHALK & TALK	<input checked="" type="checkbox"/> STUD. ASSIGNMENT	<input checked="" type="checkbox"/> WEB RESOURCES	
<input type="checkbox"/> LCD/SMART BOARDS	<input type="checkbox"/> STUD. SEMINARS	<input type="checkbox"/> ADD-ON COURSES	

**ASSESSMENT METHODOLOGIES-DIRECT**

<input checked="" type="checkbox"/> ASSIGNMENTS	<input type="checkbox"/> STUD. SEMINARS	<input checked="" type="checkbox"/> TESTS/MODEL EXAMS	<input checked="" type="checkbox"/> UNIV. EXAMINATION
<input type="checkbox"/> STUD. LAB PRACTICES	<input checked="" type="checkbox"/> STUD. VIVA	<input type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> OTHERS		

**ASSESSMENT METHODOLOGIES-INDIRECT**

<input checked="" type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input type="checkbox"/> STUDENT FEEDBACK ON FACULTY (TWICE)
<input type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

**Prepared by  
(Saritha S)**

**Approved by  
(HOD)**



**Course Plan**

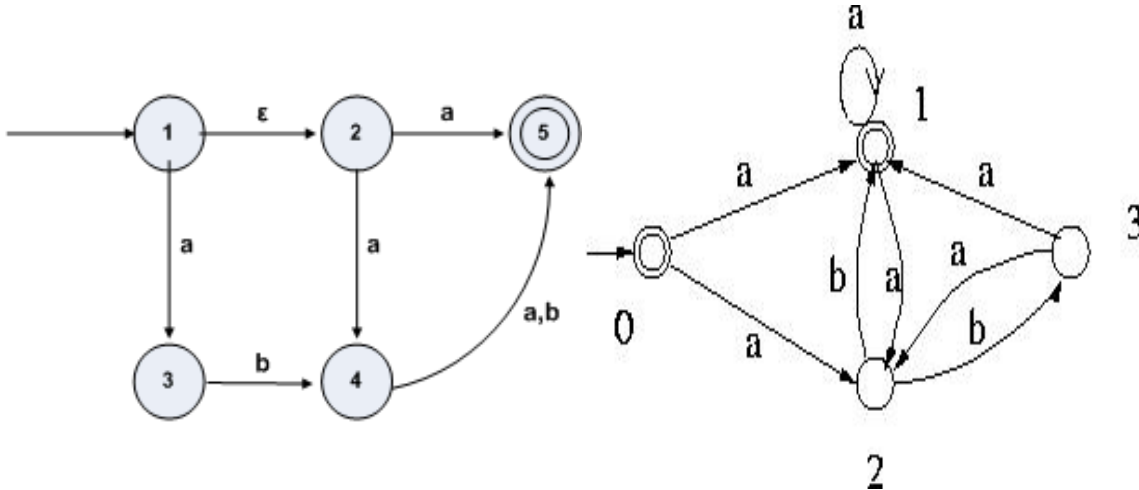
<b>Day</b>	<b>Topic</b>	<b>Hours</b>
1	Introduction to Formal Languages	1
2	History of Automata theory	1
3	Formal Languages- Chomsky classification	1
4	Language operations- Concatenation, Kleene Closure	1
5	Finite automata- Introduction , application	1
6	Transition diagram and table	1
7	DFA	1
8	DFA – Problem	1
9	DFA – Problem	1
10	NFA with and without epsilon	1
11	NFA Problems	1
12	NFA to DFA conversion	1
13	NFA to DFA conversion	1
14	Equivalence of NFA and DFA – Proof	1
15	Minimization of DFA	1
16	Tutorial	1
17	Finite automata with output –Moore machine /Mealey Machine	1
18	Regular expressions- Properties of regular sets	1
19	Ardens theorem	1

20	DFA to regular expressions	1
21	Regular expression to DFA	1
22	Pumping Lemma	1
23	Closure properties	1
24	Introduction to CFG- Derivation tree	1
25	Ambiguity, Simplification of CFL	1
26	Normal Forms	1
27	Push Down Automata	1
28	Language Acceptability by PDA	1
29	Deterministic/Non deterministic PDA	1
30	Pumping Lemma, applications of PDA	1
31	Turing machines- Formal definition	1
32	Language acceptability by TM	1
33	Language acceptability by TM	1
34	UTM, Equivalence of single and multi tape	1
35	Linear bounded automata	1
36	Recursive and recursively enumerable languages	1
37	Decidable and undecidable problems	1
38	Tractable and intractable problems	1
39	Halting problem	1
40	Reducability, Church Turing Thesis	1
41	Tutorial	1

## TUTORIAL QUESTIONS

### TUTORIAL 1

- Convert the following NFAs to DFAs.

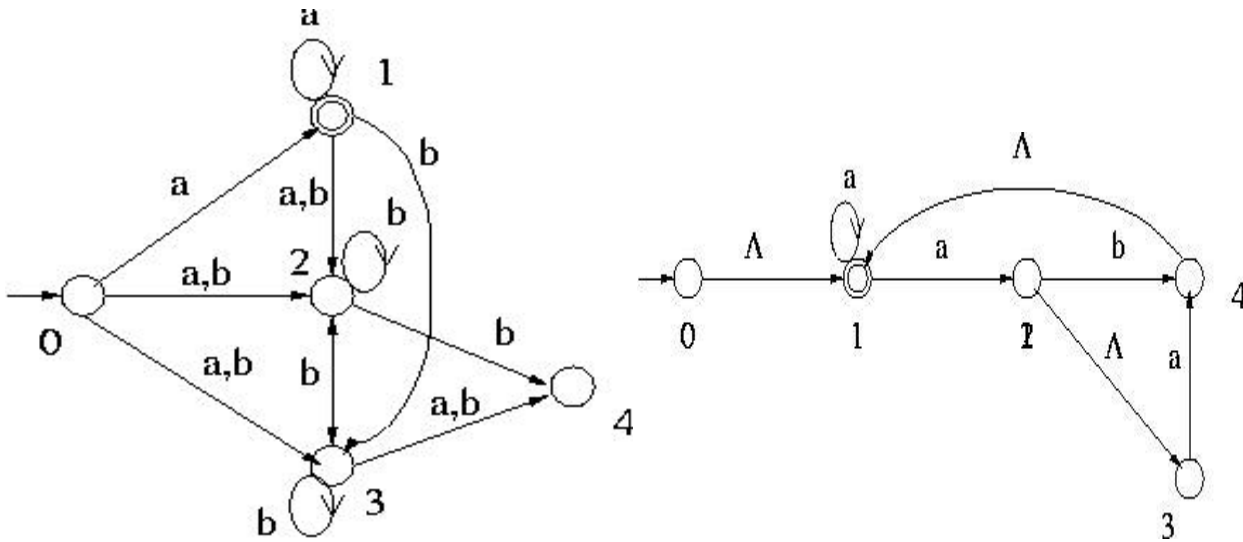


#### Design the following DFAs

- All strings of a and b with no more than three a's
- All strings of a and b that has neither **aa** nor **bb** as a substring

### TUTORIAL 2

- Convert the following NFA to DFA



**Design the following DFAs**

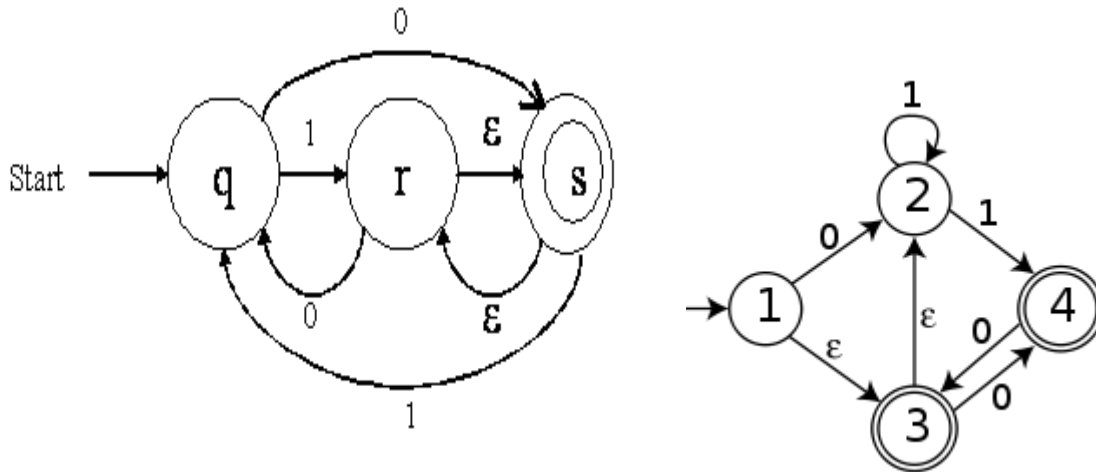
1. All strings of a and b has both **ab** and **ba** as substrings
2. All strings of a and b that have exactly two a's and at least three b's

**TUTORIAL 3**

Design DFAs

1. All strings of a and b with exactly one occurrence of the substring **aaa**
2. All strings of a and b has **abab** as a substring

Convert the following NFAs to equivalent DFAs



#### TUTORIAL -4

**Write regular expressions for the following**

- 1) Set of strings starting with 0 on  $\Sigma=\{0,1\}$ .
- 2) Set of strings ending with 1 on  $\Sigma=\{0,1\}$
- 3) Set of strings containing exactly two 0's.
- 4) Set of strings containing atleast two 0's.
- 5) Strings not ending in 01.
- 6) Strings starting with 11.
- 7) Strings having even length of 0's.
- 8) Strings that either starts with 01 or ends with 01.
- 9) Strings that have atleast two consecutive 0's and two consecutive 1's.
- 10) Strings that starts with 10 and ends with 01.
- 11) String of the form  $a^n b^m$  such that  $(m+n)$  is even.
- 12) Strings of the form  $a^n b^m$  such that  $(m+n)$  is odd.
- 13) Set of strings that does not have a pair of consecutive 0's.

- 14) Set of strings that does not contain a pair of consecutive 1's.
- 15) Set of strings where every 0 is followed by 11.
- 16) Set of strings with atmost 1 pair of consecutive 1's.

**ASSIGNMENT QUESTIONS****ASSIGNMENT - 1****SUBMISSION DATE – 30<sup>th</sup> August 2024**

1) Design DFA for the following

- A.  $L = \{w \mid w \text{ is of even length and begins with } 01\}$
- B.  $L = \{0^n \mid n \bmod 3 = 2, n \geq 0\}$
- C.  $L = \{w \mid w \text{ starts and end with same symbol from } \Sigma = \{0,1\}\}$
- D. Language over input alphabets  $\Sigma = \{a, b\}$  such that L is the set of all strings starting with 'aa' or 'bb'.
- E. Language accepting odd or even binary numbers strings over input alphabets  $\Sigma = \{0, 1\}$
- F.  $L = \{x \mid x \text{ is an element of } \{0,1\}^*, x \text{ is a binary representation of natural numbers which is the multiple of } 5.\}$

2) Design NFA for the following

- A. Accept the number of zeros that must be divisible by 3 over  $\{0\}$
- B. Accept the string that consists of either  $(01)^*$  OR  $(010)^*$ .
- C. Accept the string whose length is either multiple by 2 OR 3 on  $\Sigma = \{a\}$

**ASSIGNMENT - 2****SUBMISSION DATE – 30<sup>th</sup> October 2024**1. Turing Machine Variants

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**101902/IT500E**  
**MANAGEMENT FOR SOFTWARE**  
**ENGINEERS**



### COURSE INFORMATION SHEET

PROGRAMME: <b>INFORMATION TECHNOLOGY</b>	DEGREE: <b>B. TECH</b> YEAR: <b>2024-25</b>
COURSE: <b>MANAGEMENT FOR SOFTWARE ENGINEERS</b>	SEMESTER: <b>V</b> CREDITS: <b>3</b>
COURSE CODE: <b>101902/IT500E</b> REGULATION: <b>2021</b>	COURSE TYPE: <b>CORE</b>
COURSE AREA/DOMAIN: <b>SOFTWARE ENGINEERING</b>	CONTACT HOURS: 3 hours/Week
CORRESPONDING LAB COURSE CODE (IF ANY): NA	LAB COURSE NAME: NA

**SYLLABUS:**

UNIT	DETAILS	HOURS
I	<p><b>Introduction:</b> Software engineering, Software process, Software engineering practice.</p> <p><b>Process models:</b> Prescriptive process models- Specialized process models, The unified process, Personal and Team process models.</p> <p><b>Agile development:</b> Agility, Agile process. Extreme programming- XP Values, The XP Process, Industrial XP, The XP Debate. Other Agile development models- Adaptive Software Development (ASD), Scrum, Dynamic Systems Development Method (DSDM), Crystal, Feature Driven Development (FDD), Lean Software Development (LSD), Agile Modeling (AM), Agile Unified Process (AUP).</p> <p>Selection of an appropriate Project Approach- Choice of process Models.</p>	8
II	<p><b>Managing software projects:</b> Project Management Concepts- The Management Spectrum People- Product- Process- Project.</p>	5

	<p><b>Software Project Management:</b> Importance - Software projects VS other types of project - Categorizing Software projects- Stakeholders -Setting Objectives - The Business Case Project success and failure.</p> <p><b>Management:</b> Activities- Management Control- Traditional VS modern project management.</p>	
III	<p><b>Project Evaluation:</b> Project portfolio management- Evaluation of individual projects- Cost benefit evaluation techniques- Risk evaluation- Programme Management- Creating a Programme- Aids to Programme Management- Benefits Management.</p> <p><b>Project Planning:</b> Step wise Project Planning</p> <p><b>Software Estimation:</b> Basis for software estimation- Software Effort estimation techniques-Bottom-up and Top-down estimation- Function Point Analysis- COCOMO II. Cost Estimation- Staffing Pattern- Schedule compression.</p>	8
IV	<p><b>Activity Planning:</b> Objectives- Project Schedules- Projects and Activities- Sequencing and Scheduling Activities- Network Planning Models- Forward Pass- Backward pass- Identifying Critical Path and Critical Activities- Activity-on-arrow networks.</p> <p><b>Risk Management:</b> Risk- Categories of Risk- Risk Identification- Risk Assessment- Risk Planning- Risk management- Risk Evaluation- PERT, Monte Carlo Simulation, Critical Chain.</p> <p><b>Resource Allocation:</b> Nature of Resources- Identifying and Scheduling Resources- Creating Critical Paths- Cost Schedule- Scheduling sequence.</p>	7
V	<p><b>Monitoring and Control:</b> Creating the framework- Collecting data- Review- Project Termination Review- Visualizing Progress- Gantt Chart, Slip Chart, Timeline. Cost Monitoring- Earned Value Analysis- Getting the project back to target- Change Control-Software Configuration Management- Contract management.</p>	7

	<p><b>Managing People:</b> Organizational Behaviour- Selecting the right Person – Motivation – Stress-Working in Teams- Becoming a Team- Decision Making- Organization and Team Structures-Communication- Leadership.</p> <p><b>Software Quality:</b> Quality Management Systems- Process Capability Models- CMMI, Six Sigma. Techniques for Enhancing Software Quality - Testing- Software Reliability- Quality Plans.</p>	
<b>TOTAL HOURS</b>		<b>35</b>

**TEXT/REFERENCE BOOKS:**

T/R	BOOK TITLE/AUTHORS/PUBLICATION
T	Roger S Pressman, Software Engineering: A Practitioner’s Approach, Seventh edition, Tata McGrawHill.
T	Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGrawHill
R	Pankaj Jalote, Software Project Management in Practice, PearsonEducation
R	Walker Royce, Software Project Management- Addison-Wesley,1998.
R	Sunitha E.V, Sarath K.S, Software Project Management, Jyothis Publishers2019

**Course Prerequisite: NIL**
**Course Objectives:**

1	To impart the basic understanding of the concepts of software engineering and software development life cycle.
2	To provide the key concepts aspects of managing a software project like project evaluation, planning and monitoring along with management of people.
3	To describe the techniques for ensuring software quality.

**Course Outcomes:**

CO No.	Course Outcome (CO)	Bloom’s Category
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<b>101902/ IT500E. CO1</b>	Understand about the basics of software process, software development life cycle and process models.	Understand
<b>101902/ IT500E. CO2</b>	Interpret the concepts of managing software projects.	Understand
<b>101902/ IT500E. CO3</b>	Make use of project evaluation techniques and choose software estimation approaches for effort and cost.	Apply
<b>101902/ IT500E. CO4</b>	Explain on planning the project activities and describe the concepts of risk management and resource allocation.	Understand
<b>101902/ IT500E. CO5</b>	Understand project monitoring and control, organize people and teams and describe the techniques for ensuring software quality.	Understand

**CO-PO-PSO Mapping**

COs	P O 1	P O 2	PO 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	PO 10	PO 11	PO 12	P S O 1	PS O2	PS O 3
<b>101902/ IT500E. CO1</b>	2	2								1	1	2	2		
<b>101902/ IT500E. CO2</b>	2	2								1	1	2			3
<b>101902/ IT500E. CO3</b>	2	1								1	1	2	3		
<b>101902/ IT500E. CO4</b>	2	1								1	1	2		3	
<b>101902/ IT500E. CO5</b>	2	2						1	2	1	2	2			

**JUSTIFICATIONS FOR CO-PO-PSO MAPPING**

<b>Mapping</b>	<b>LOW/ME DIUM/HI GH</b>	<b>Justification</b>
<b>101902/IT500E. 1-PO1</b>	M	Students could apply fundamental engineering knowledge for describing software process.
<b>101902/IT500E. 1-PO2</b>	M	Students could identify the software process models.
<b>101902/IT500E. 1-PO10</b>	L	Knowledge in software models help students to clearly gather requirements from stakeholders.
<b>101902/IT500E. 1-PO11</b>	L	Students will be able to select process models for a given problem
<b>101902/IT500E. 1-PO12</b>	M	Students will be able to design components for solving complex problems
<b>101902/IT500E. 1-PS01</b>	M	Students gain knowledge in software process models.
<b>101902/IT500E. 2-PO1</b>	M	Students acquire competency in building software projects.
<b>101902/IT500E. 2-PO2</b>	M	Students will be able to develop software projects by setting objectives.
<b>101902/IT500E. 2-PO10</b>	L	Students can solve design problems with knowledge in management.
<b>101902/IT500E. 2-PO11</b>	L	Students will acquire skills in developing business case.
<b>101902/IT500E. 2-PO12</b>	M	Students will be able to classify people, product, process and project.
<b>101902/IT500E. 2-PS03</b>	H	Students will be able to understand the project management spectrum and activities.
<b>101902/IT500E. 3-PO1</b>	M	Students gain competency in cost estimation.
<b>101902/IT500E.</b>	L	Students will be able to apply cost estimation techniques in

<b>3-PO2</b>		developing projects.
<b>101902/IT500E. 3-P010</b>	L	Students acquire competency in stepwise project planning.
<b>101902/IT500E. 3-P011</b>	L	Students will be able to identify project portfolio management.
<b>101902/IT500E. 3-P012</b>	M	Students will be able to apply software effort estimation techniques.
<b>101902/IT500E. 3-PS01</b>	H	Students will be able to create a programme management.
<b>101902/IT500E. 4-P01</b>	M	Students will be able to identify different risk assessment techniques.
<b>101902/IT500E. 4-P02</b>	L	Students will gain knowledge in sequencing and scheduling activities.
<b>101902/IT500E. 4-P010</b>	L	Students gain competency in identifying risks and management of risks.
<b>101902/IT500E. 4-P011</b>	L	Students will be to identify and schedule resources.
<b>101902/IT500E. 4-P012</b>	M	Students will be to identify critical path and critical activities.
<b>101902/IT500E. 4-PS02</b>	H	Students will be able to plan the activities, manage the risk and allocate resources.
<b>101902/IT500E. 5-P01</b>	M	Students will be able to monitor and control the project.
<b>101902/IT500E. 5-P02</b>	M	Students will be able to manage the people.
<b>101902/IT500E. 4-P08</b>	L	Students acquire knowledge in quality management systems.
<b>101902/IT500E. 4-P09</b>	M	Students will be able to evaluate the process capability models.
<b>101902/IT500E. 4-P010</b>	L	Students will be able to work in teams.
<b>101902/IT500E. 4-P011</b>	M	Students will be able to develop reliable software applications.

<b>101902/IT500E. 4-P012</b>	M	Students will be able to have an awareness on software configuration management.
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**GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:**

Sl. No.	DESCRIPTION	PROPOSED ACTIONS	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Familiarization of UML diagrams using tools	PROVIDED LEARNING MATERIAL	2,12	3

**TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:**

Sl.No.	DESCRIPTION	PROPOSED ACTIONS	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Familiarization of different testing strategies.	PROVIDED LEARNING MATERIAL	11,12	1

**WEB SOURCE REFERENCES:**

1	<a href="http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Soft%20Engg/New_index1.html">http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Soft%20Engg/New_index1.html</a>
2	<a href="http://www.cl.cam.ac.uk/~lp15/papers/Notes/SE-I.pdf">http://www.cl.cam.ac.uk/~lp15/papers/Notes/SE-I.pdf</a>
3	<a href="http://www2.imm.dtu.dk/courses/02161/2012/slides/week01ln.pdf">http://www2.imm.dtu.dk/courses/02161/2012/slides/week01ln.pdf</a>
4	<a href="http://www.dcs.ed.ac.uk/teaching/cs1/CS1/Ah/Notes/IntroSoftwareEng.pdf">http://www.dcs.ed.ac.uk/teaching/cs1/CS1/Ah/Notes/IntroSoftwareEng.pdf</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

<input checked="" type="checkbox"/> CHALK & TALK	<input checked="" type="checkbox"/> STUD. ASSIGNMENT	<input checked="" type="checkbox"/> WEB RESOURCES
<input type="checkbox"/> LCD/SMART BOARDS	<input checked="" type="checkbox"/> STUD. SEMINARS	<input type="checkbox"/> ADD-ON COURSES

**ASSESSMENT METHODOLOGIES - DIRECT**

<input checked="" type="checkbox"/> ASSIGNMENTS	<input checked="" type="checkbox"/> STUD. SEMINARS	<input checked="" type="checkbox"/> TESTS/MODEL EXAMS	<input checked="" type="checkbox"/> UNIV. EXAMINATION
<input checked="" type="checkbox"/> STUD. LAB PRACTICES	<input checked="" type="checkbox"/> STUD. VIVA	<input type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
<input type="checkbox"/> ADD-ON COURSES		<input type="checkbox"/> OTHERS	

**ASSESSMENT METHODOLOGIES - INDIRECT**

<input checked="" type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input type="checkbox"/> STUDENT FEEDBACK ON FACULTY (ONCE)
<input type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

**Prepared by**  
**Ms.Taniya Shirley Stalin**

**Approved by**  
**Dr. Ranju S Kartha**  
**(HoD-IT)**



## COURSE PLAN

No	Topic	No. of Lectures
<b>1</b>	<b>Module 1: Introduction</b>	<b>8 Hours</b>
1.1	Software engineering - Software process - Software engineering Practice.	1 Hour
1.2	Process models: Prescriptive process models - Specialized process models - The unified process - Personal and Team process models.	3 Hours
1.3	Agile development:Agility - Agile process. Extreme programming - XP Values - The XP Process - Industrial XP - The XP Debate. Other Agile development models - Adaptive Software Development (ASD) - Scrum - Dynamic Systems Development Method (DSDM) - Crystal - Feature Driven Development (FDD) - Lean Software Development (LSD) - Agile Modeling (AM) - Agile Unified Process (AUP). Selection of an appropriate Project Approach - Choice of process Models.	4 Hours
<b>2</b>	<b>Module 2: Managing Software Projects</b>	<b>5 Hours</b>
2.1	Project Management Concepts - The Management Spectrum - People - Product - Process- Project.	1 Hour
2.2	Software Project Management- Importance - Software projects VS other types of project - Categorizing Software projects - Stakeholders - Setting Objectives - The Business Case - Project success and failure.	3 Hours
2.3	Management - Activities - Management Control - Traditional VS modern project management.	1 Hour
<b>3</b>	<b>Module 3: Evaluation, Planning and Estimation</b>	<b>8 Hours</b>
3.1	Project Evaluation:Project portfolio management - Evaluation of individual projects - Cost benefit evaluation techniques - Risk evaluation - Programme Management - Creating a Programme -Aids to Programme Management - Benefits Management.	3 Hours

3.2	Project Planning: Step wise Project Planning.	2 Hours
3.3	Software Estimation: Basis for software estimation - Software Effort estimation techniques - Bottom-up and Top-down estimation - Function Point Analysis - COCOMO II. Cost Estimation - Staffing Pattern - Schedule compression.	3 Hours
<b>4</b>	<b>Module 4: Activity Planning, Risk Management and Resource Allocation</b>	<b>7 Hours</b>
4.1	Activity Planning: Objectives - Project Schedules - Projects and Activities - Sequencing and Scheduling Activities - Network Planning Models - Forward Pass - Backward pass - Identifying Critical Path and Critical Activities - Activity-on-arrow networks.	3 Hours
4.2	Risk Management: Risk - Categories of Risk - Risk Identification - Risk Assessment - Risk Planning - Risk management - Risk Evaluation - PERT, Monte Carlo Simulation, Critical Chain.	2 Hours
4.3	Resource Allocation: Nature of Resources - Identifying and Scheduling Resources - Creating Critical Paths - Cost Schedule - Scheduling sequence.	2 Hours
<b>5</b>	<b>Module 5: Monitoring, People Management, Quality</b>	<b>7 Hours</b>
5.1	Monitoring and Control: Creating the framework - Collecting data - Review - Project Termination Review - Visualizing Progress - Gantt Chart, Slip Chart, Timeline. Cost Monitoring - Earned Value Analysis - Getting the project back to target - Change control - Software Configuration Management - Contract management.	3 Hours
5.2	Managing People: Organizational Behavior - Selecting the right Person - Motivation - Stress - Working in Teams - Becoming a Team - Decision Making - Organization and Team Structures - Communication - Leadership.	2 Hours
5.3	Software Quality: Quality Management Systems - Process Capability Models - CMMI, Six Sigma. Techniques for Enhancing Software Quality - Testing - Software Reliability - Quality Plans.	2 Hours

## **ASSIGNMENT QUESTIONS**

### **Assignment 1**

1. Identify the ways to select an appropriate process model.
2. Compare Traditional and Modern Project Management Practices.
3. Write short notes on:
  1. Industrial XP
  2. The XP Debate

### **Assignment 2**

1. Cost Estimation
  - Staffing Pattern
  - Schedule compression
2. Explain the BASIC, INTERMEDIATE and DETAILED COCOMO MODEL and its effort estimation techniques.

### **Assignment 3**

1. Explain in detail about software configuration management and contract management.
2. Explain the critical chain concepts in risk management.
3. Describe about :
  - a. Software Reliability
  - b. Quality plans

# **10908/C0500F**

# **DISASTER MANAGEMENT**

### COURSE INFORMATION SHEET

PROGRAMME: <b>INFORMATION TECHNOLOGY</b>	DEGREE: <b>B.TECH</b>
COURSE: <b>DISASTER MANAGEMENT</b>	SEMESTER: <b>Fifth</b> CREDITS: Nil
COURSE CODE: 10908/CO500F REGULATION: <b>2021</b>	COURSE TYPE: CORE
COURSE AREA/DOMAIN: ENGINEERING (All Branches)	CONTACT HOURS: 2 hours/ Week
CORRESPONDING LAB COURSE CODE (IF ANY): <b>No</b>	LAB COURSE NAME: <b>NA</b>

**PREAMBLE :**

The objective of this course is to introduce the fundamental concepts of hazards and disaster management.

**SYLLABUS:**

UNIT	DETAILS	HOURS
I	Systems of earth Lithosphere- composition, rocks, soils; Atmosphere-layers, ozone layer, greenhouse effect, weather, cyclones, atmospheric circulations, Indian Monsoon; hydrosphere- Oceans, inland water bodies; biosphere Definition and meaning of key terms in Disaster Risk Reduction and Management- disaster, hazard, exposure, vulnerability, risk, risk assessment, risk mapping, capacity, resilience, disaster risk reduction, disaster risk management, early warning systems, disaster preparedness, disaster prevention, disaster mitigation, disaster response, damage assessment, crisis counselling, needs assessment.	5
II	Hazard types and hazard mapping; Vulnerability types and their assessment- physical, social, economic and environmental vulnerability. Disaster risk assessment – approaches, procedures	5
III	Disaster risk management -Core elements and phases of Disaster Risk Management Measures for Disaster Risk Reduction – prevention, mitigation, and preparedness. Disaster response- objectives, requirements; response planning; types of responses. Relief; international relief organizations.	5
IV	Participatory stakeholder engagement; Disaster communication- importance, methods, barriers; Crisis counselling	5

	Capacity Building: Concept – Structural and Non-structural Measures, Capacity assessment; Strengthening Capacity for Reducing Risk	
V	Common disaster types in India; Legislations in India on disaster management; National disaster management policy; Institutional arrangements for disaster management in India. The Sendai Framework for Disaster Risk Reduction- targets, priorities for action, guiding Principles	5
<b>TOTAL HOURS</b>		<b>25</b>

**TEXT/REFERENCE BOOKS:**

T/R	BOOK TITLE/AUTHORS/PUBLICATION
R	1. R. Subramanian, Disaster Management, Vikas Publishing House, 2018 2. M. M. Sulphay, Disaster Management, PHI Learning, 2016 3. UNDP, Disaster Risk Management Training Manual, 2016 4. United Nations Office for Disaster Risk Reduction, Sendai Framework for Disaster Risk Reduction 2015-2030, 2015

**COURSE PRE-REQUISITES:**

C.CODE	COURSE NAME	DESCRIPTION	SEM
NIL			

**COURSE OUTCOMES:**

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

CO No.	Course Outcome (CO)	Bloom's Category
10908/CO500F.1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle	Level 2 : Understand
10908/CO500F.2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment	Level 2 : Understand

10908/CO500F.3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk	Level 2 : Understand
10908/CO500F.4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community	Level 3 : Apply
10908/CO500F.5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions	Level 2 : Understand
10908/CO500F.6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level	Level 2 : Understand

**CO-PO AND CO-PSO MAPPING**

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PSO 1	PSO 2	PSO 3
10908/CO5 00F.1	-	2	-	-	-	2	-	-	-	2	-	2	-	1	1
10908/CO5 00F.2	2	3	2	-	2	2	3	-	-	3	-	2	-	2	-
10908/CO5 00F.3	2	3	2	2	2	2	3	-	-	3	-	2	-	-	1
10908/CO5 00F.4	3	3	3	-	2	2	3	-	-	-	-	2	1	-	-

10908/C05 00F.5	3	3	-	-	2	2	3	-	-	-		2	-	-	1
10908/C05 00F.6	3	-	-	-	-	2	3	3	-	-	-	2	1	-	2

**JUSTIFICATIONS FOR CO-PO/PSO MAPPING**

MAPPING	LOW/MEDIUM /HIGH	JUSTIFICATION
CO1-PO2	M	Awareness of standard terms used in disaster management will help students address practical engineering problems in challenging environments.
CO1-PO6	M	Awareness of standard terms used in disaster management will help students assess the societal, health, and safety issues relevant to professional engineering practice.
CO1-PO10	M	Awareness of standard terms used in disaster management will help students communicate effectively with the engineering community and society during an emergency
CO1-PO12	M	Awareness of standard terms used in disaster management will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.
CO1-PSO2	L	Students can apply their analytical skill and knowledge in developing algorithms for hazardous events
CO1-PSO3	L	Students can develop strong skills to mitigate, prepare and prevent disaster by implementing software solutions
CO2-PO1	M	Various mathematical and numerical tools are used in vulnerability assessment.
CO2 - PO2	H	Extensive research and a basic understanding of mathematics are needed to conduct vulnerability assessments.



C02-P03	M	Assessing vulnerability helps the stakeholders to design a practical disaster management framework.
C02-P05	M	Complex analytical and numerical modeling tools are used in vulnerability assessment.
C02-P06	M	Awareness of different hazard types and vulnerabilities will help the students to assess the societal, health, and safety issues relevant to the professional engineering practice.
C02-P07	H	Assessing vulnerability is essential in improving the capacity to reduce the risks related to disasters.
C02-P010	H	The students will identify the vulnerable community/society/individuals and communicate with them effectively.
C02-P012	M	Awareness of disasters and vulnerability will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.
C02-PS02	M	Students can contribute their engineering skills in hazard mapping and participatory mapping
C03-P01	M	Various empirical and analytical methods are used in risk assessment.
C03-P02	H	Extensive research and a basic understanding of science, mathematics, and social sciences are needed to conduct a risk assessment.
C03-P03	M	Risk assessment helps the stakeholders to design a practical disaster management framework.
C03-P04	M	Research-based knowledge and a basic understanding of data analysis, data interpretation, and information synthesis are required to carry out a risk assessment.
C03-P05	M	Complex analytical and numerical modeling tools are used to assess natural hazards like floods, earthquakes, landslides, etc.
C03-P06	M	Awareness of risk assessment fundamentals will help the students assess the societal, health, and safety issues relevant to the professional engineering practice.

C03-P07	H	Understanding elements at risk and risk assessment are essential in strengthening the capacity, developing sustainable mitigation measures, and improving resilience.
C03-P010	H	The students will identify the community/society/individuals at risk and communicate with them effectively.
C03-P012	M	Awareness of future risks and risk assessment will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.
C03-PS03	L	Students can able to identify the different apply appropriate methodologies to assess risk
C04-P01	H	A basic understanding of engineering sciences and mathematics is needed to reduce disaster risks across sectors and communities.
C04-P02	H	Extensive research and a basic understanding of science, mathematics, and social sciences are needed to develop risk reduction measures.
C04-P03	H	A decent disaster management framework helps the stakeholders to develop risk reduction measures.
C04-P05	M	GIS and numerical modeling softwares can be used to analyze natural hazards like floods, earthquakes, landslides, etc.
C04-P06	M	Awareness of disaster risk management fundamentals will help the students assess the societal, health, and safety issues relevant to the professional engineering practice.
C04-P07	H	Understanding the core elements and phases of disaster risk management is essential in strengthening the capacity, developing sustainable mitigation measures, and improving resilience.
C04-P012	M	Awareness of disaster risk management strategies will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.
C04-PS01	L	Design and develop possible measures to reduce disaster risk
C05-P01	H	A basic understanding of engineering and social sciences is needed to formulate disaster response strategies.

C05-P02	H	Extensive research and a basic understanding of science, mathematics, and social sciences are needed to develop disaster response measures.
C05-P05	M	Modern tools like GIS, GPS, etc., are used to develop emergency plans for natural hazards.
C05-P06	M	Awareness of the fundamentals of disaster response will help the students to assess the societal, health, and safety issues relevant to the professional engineering practice
C05-P07	H	Understanding disaster response strategies is essential in strengthening the capacity, developing sustainable mitigation measures, and improving resilience.
C05-P012	M	Awareness of disaster response strategies will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.
C05-PS03	L	Students can able to deign various solutions for disaster response actions
C06-P01	H	Awareness of various legislations, policies, and frameworks in disaster management will help students address practical engineering problems in challenging environments.
C06-P06	M	Awareness of various legislations, policies, and frameworks in disaster management will help students assess the societal, health, and safety issues relevant to professional engineering practice.
C06-P07	H	Understanding various legislations, policies, and frameworks in disaster management is essential in strengthening the capacity, developing sustainable mitigation measures, and improving resilience.
C06-P08	H	A professional engineer should be aware of various legislations, policies, and frameworks in disaster management.
C06-P012	M	Awareness of various legislations, policies, and frameworks in disaster management will help students pursue independent and life-long learning in the broadest context of technological change post-pandemic.

CO6-PS01	L	Modern tools can be used for early warning systems related with cyclone , tsunami etc
CO6-PS03	M	Students can utilize knowledge and experience gained through activities to develop new designs at national and international levels

**GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:**

SNO	DESCRIPTION	PROPOSED ACTIONS
1	Risk Management and reduction strategies related with Kerala floods	Assignment
2	Case studies of natural hazards	Classroom lectures

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

**TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:**

1	Early warning systems for disasters
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**WEB SOURCE REFERENCES:**

1	<a href="https://nptel.ac.in/courses/105/104/105104183/">https://nptel.ac.in/courses/105/104/105104183/</a>
2	<a href="https://nptel.ac.in/courses/124/107/124107010/">https://nptel.ac.in/courses/124/107/124107010/</a>
3	<a href="https://onlinecourses.swayam2.ac.in/cec19_hs20/preview">https://onlinecourses.swayam2.ac.in/cec19_hs20/preview</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

✓ CHALK & TALK	✓ STUD. ASSIGNMENT	✓ WEB RESOURCES
✓ LCD/SMART BOARDS	STUD. SEMINARS	ADD-ON COURSES

**ASSESSMENT METHODOLOGIES-DIRECT**

✓ ASSIGNMENTS	STUD. SEMINARS	✓ TESTS/MODEL EXAMS	✓ UNIV. EXAMINATION
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STUD. LAB PRACTICES	<input type="checkbox"/> STUD. VIVA	<input type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
<input type="checkbox"/> ADD-ON COURSES	<input type="checkbox"/> OTHERS		

**ASSESSMENT METHODOLOGIES-INDIRECT**

<input checked="" type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input checked="" type="checkbox"/> STUDENT FEEDBACK ON FACULTY (TWICE)
<input type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

**Prepared by**  
**Kuttyamma A J**

**Approved by**  
**(HOD)**

### Course Plan

Course Plan			
Sl.No	Module	Planned Date	Planned
1	1	29-Jul-2024	Course Introduction
2	1	2-Aug-2024	Introduction about various Systems of earth, Lithosphere, composition, rocks, Soils; Atmosphere-layers, ozone layer, greenhouse effect, weather
3	1	5-Aug-2024	Cyclones, atmospheric circulations, Indian Monsoon; hydrosphere, Oceans, inland water bodies; biosphere
4	1	9-Aug-2024	Definition and meaning of key terms in Disaster Risk Reduction and Management- disaster, hazard, Exposure, vulnerability, risk, risk assessment, risk mapping, capacity, resilience, disaster risk reduction, Disaster risk management, early warning systems
5	1	12-Aug-2024	Disaster preparedness, disaster prevention, disaster, Mitigation, disaster response, damage assessment, crisis counselling, needs assessment
6	2	16-Aug-2024	Various Hazard types, Hazard mapping; Different types of Vulnerability types and their assessment
7	2	19-Aug-2024	Vulnerability assessment and types, Physical and social vulnerability, Economic and environmental vulnerability
8	2	23-Aug-2024	Core elements of disaster risk assessment, Components of a comprehensive disaster preparedness strategy approaches, procedures
9	2	30-Aug-2024	Components of a comprehensive disaster preparedness strategy approaches, procedures, Different disaster response actions
10	3	2-Sep-2024	Introduction to Disaster risk management, Core elements of Disaster Risk Management
11	3	23-Sep-2024	Phases of Disaster Risk Management, Measures for Disaster Risk Reduction, Measures for Disaster prevention, mitigation, and preparedness.

12	3	27-Sep-2024	Disaster response- objectives, requirements. Disaster response planning; types of responses
13	3	27-Sep-2024	Introduction- Disaster Relief, Relief; international relief organizations
14	4	30-Sep-2024	Participatory stakeholder engagement
15	4	4-Oct-2024	Importance of disaster communication, Disaster communication- methods, barriers. Crisis counselling
16	4	7-Oct-2024	Introduction to Capacity Building. Concept – Structural Measures, Non-structural Measures
17	4	14-Oct-2024	Introduction to Capacity Assessment, Capacity Assessment;, Strengthening, Capacity for Reducing Risk
18	4	18-Oct-2024	Disaster communication- methods, barriers. Crisis counseling
19	4	21-Oct-2024	Module III & IV revision
20	5	25-Oct-2024	Introduction-Common disaster types in India
21	5	4-Nov-2024	Common disaster legislations in India on disaster management
22	5	8-Nov-2024	National disaster management policy, Institutional arrangements for disaster management in India
23	5	11-Nov-2024	The Sendai Framework for Disaster Risk Reduction and target, The Sendai Framework for Disaster Risk Reduction- priorities for action, guiding principle
24	5	15-Nov-2024	Revision

## Assignments

### Assignment 1

Prepare an A4 size poster related to Wayanad landslide disaster – causes, risk reduction management activities, Risk assessment, vulnerability ((**Exposure**) (**Resistance**) (**Resilience**))

**Submit on or before 29/08/2024**

### Assignment 2

Group Presentation (Group of 5)

Presentation starts from October 15<sup>th</sup> onwards

1. International Relief organisation – Part 1
  - a. CARE
  - b. Caritas Internationalis,
  - c. Catholic Relief Services, (CRS - USCC)
  - d. Emergency Nutrition Network (ENN)
  - e. Doctors Without Borders
2. International Relief organisation – Part 2
  - a. Action Against Hunger (AAH)
  - b. Food For the Hungry International (FHI)
  - c. International Committee of the Red Cross (ICRC)
  - d. International Federation of Red Cross and Red Crescent Societies (IFRC)
  - e. International Rescue Committee (IRC)



- f. International Organisation for Migration (IOM)
  3. Legislations in India on disaster management – Part 1
    - a. General Introduction (explain the titles with brief notes) to Compendium of Laws on Disaster Management<sup>1</sup>
  4. Legislations in India on disaster management – Part 2
    - a. General Acts (chapter 1) at Compendium of Laws on Disaster Management
  5. Legislations in India on disaster management – Part 3
    - a. Food, dam burst, tsunami, and cyclone (chapter 4) at Compendium of Laws on Disaster Management
  6. Legislations in India on disaster management – Part 4
    - a. Earthquake, snow avalanches/ landslide (chapter 6) at Compendium of Laws on Disaster Management
  7. Legislations in India on disaster management – Part 5
    - a. Accident (chapter 10) at Compendium of Laws on Disaster Management
  8. Legislations in India on disaster management – Part 6
    - a. Epidemic diseases (chapter 12) at Compendium of Laws on Disaster Management with special reference to Covid-19 epidemic
  9. Institutional arrangements for disaster management in India – Part 1
    - a. NDMA, SDMA, DDMA
    - b. National Institute of Disaster Management (NIDM)
  10. Institutional arrangements for disaster management in India – Part 2
    - a. National Disaster Response Force (NDRF)
  11. National disaster management policy (Ref: (chapter 20) of Compendium of Laws on Disaster Management)
-

12. United Nations' Sendai Framework for Disaster Risk Reduction
13. Emergency Action Plan of Idukki and Cheruthoni Dams by KSEB and discuss the inundation maps.
14. Common disaster types in India

**101004/IT522S**  
**OPERATING SYSTEMS AND**  
**NETWORK PROGRAMMING LAB**

### COURSE INFORMATION SHEET

<b>PROGRAMME: TECHNOLOGY</b>	<b>INFORMATION</b>	<b>DEGREE: BTECH</b>
<b>COURSE: AND NETWORK LAB</b>	<b>OPERATING SYSTEMS PROGRAMMING</b>	<b>SEMESTER: V CREDITS: 1</b>
<b>COURSE CODE : 101004/IT522S</b>	<b>REGULATION:</b>	<b>COURSE TYPE: CORE</b>
<b>2022</b>		
<b>COURSE</b>	<b>AREA/DOMAIN:</b>	<b>CONTACT HOURS: 3 hours per week</b>
<b>Programming, Data Structures and Algorithms</b>		

**SYLLABUS:**

<b>DETAILS</b>
<ol style="list-style-type: none"> <li>1. Familiarization of system calls (fork, exec, getpid, exit, wait, close, stat etc) in operating system.</li> <li>2. Implement process scheduling algorithms (FCFS, SJF, Round-Robin, Priority) and compute average waiting time and average turn-around time.</li> <li>3. Inter-process communication using mail boxes, pipes, message queues and shared memory.</li> <li>4. Implementation of dining philosophers problem using threads, semaphores and shared memory.</li> <li>5. Implementation of banker's algorithm.</li> <li>6. Implement memory management schemes (first fit, best fit and worst fit).</li>   <li>7. Familiarisation of Network Programming API in Java.</li> <li>8. Implementation of Medium Access Control protocols – 1) Go Back N. 2) Selective Repeat and 3) Sliding Window.</li> <li>9. Implementation of an echo server.</li> <li>10. Implement Client-Server communication using sockets.</li> </ol>

11. Implementation of chat application

12. Install network simulator NS-3 in Linux operating system and simulate wired and wireless scenarios. (Familiarization only)

### Lab Cycle

#### Experiment List

1. Familiarization of different types of Operating Systems Windows, Linux etc.
2. Implement fork, exec, getpid, exit, wait, close system calls.
3. Implement FCFS (Non-preemptive) scheduling algorithm and compute average waiting time and average turn-around time.

Process id	Arrival Time	Burst Time
P0	0	2
P1	1	6
P2	2	4
P3	3	9
P4	6	12

4. Implement SJF (Non-preemptive) scheduling algorithm and compute average waiting time and average turn-around time.

#### **Input**

Process id	Arrival Time	Burst Time
P1	1	7
P2	3	3
P3	6	2
P4	7	10
P5	9	8

5. Implement Priority Scheduling (Non-preemptive) scheduling algorithm and compute average waiting time and average turn-around time.

#### **Input**

Process id	Arrival Time	Burst Time	Priority
P1	0	9	5
P2	1	4	3
P3	2	5	1
P4	3	7	2
P5	4	3	4

6. Implement Round Robin scheduling algorithm and compute average waiting time and average turn-around time. (time Quantum=2 ms)

Process Id	Arrival Time(AT)	Burst Time(BT)
P1	0	4
P2	1	5
P3	2	2
P4	3	1
P5	4	6
P6	6	3

7. Implementation of IPC communication using Pipes,  
 8. Implementation of IPC communication using message queue  
 9. Implementation of IPC communication shared memory.  
 10. Implementation memory management scheme using first fit, Best fit,Worst fit .

Input: Memory size: 100kb,500kb, 200kb, 300kb, 600kb

Process size: 212kb, 417kb, 112 kb,426 kb

11. Consider the following snapshot of a system with five processes P0, P1, P2, P3, P4 and three resources A,B,C
- What are the contents of need matrix?
  - Find if the system is in safe state? If it is, find the safe sequence.

Processes	Allocation	Max	Available	Need

	A	B	C	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2			
P1	2	0	0	3	2	2						
P2	3	0	2	9	0	2						
P3	2	1	1	2	2	2						
P4	0	0	2	4	3	3						

### Network Programing

12. implementation of echo server
13. Implement bi directional chat communication between client and server.
14. Write a Socket program to find the factorial of a given number.
15. Write a Socket program to find the area of a circle.

### **TEXT/REFERENCE BOOKS:**

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, ' Operating System Concepts' 9<sup>th</sup> Edition, Wiley India 2015.
2. Samanta D., Classic Data Structures, Prentice Hall India.
3. Gottfried B.S., Programming with C, Schaum Series, Tata McGraw Hill.
4. Sumitabha Das., Unix Concepts and Applications., 4 th Edition., Tata McGraw Hill
5. Behrouz A. Forouzan, Richard F. Gilberg : UNIX and Shell Programming Cengage Learning – India Edition. 2009.
6. M.G. Venkatesh Murthy: UNIX & Shell Programming, Pearson Education.
7. Richard Blum , Christine Bresnahan : Linux Command Line and Shell Scripting Bible,2nd Edition , Wiley,2014.

### **COURSE PRE-REQUISITES:**

C.CODE	COURSE NAME	DESCRIPTION	SEM
EST102	Programming in C	The basics of C programming	S2

**COURSE OBJECTIVES:**

1	To offer students a hands-on experience on Operating System concepts using a constructivist approach and problem-oriented learning. Operating systems are the fundamental part of every computing device to run any type of software.
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**COURSE OUTCOMES:**

SLNO	DESCRIPTION	Blooms' Taxonomy Level
101004/IT522S.1	Illustrate the use of systems calls in Operating Systems	(Cognitive knowledge: Understand)
101004/IT522S.2	Implement Process Creation and Inter Process Communication in Operating Systems.	Cognitive Knowledge Level: Apply
101004/IT522S.3	Implement First Come First Served, Shortest Job First, Round Robin and Priority based CPU Scheduling Algorithms.	Cognitive Knowledge Level: Apply
101004/IT522S.4	Illustrate the concepts of Inter process communication mechanisms using pipes, message queue, shared memory.	Cognitive Knowledge Level: Apply
101004/IT522S.5	Implement modules for Deadlock Detection and Deadlock Avoidance in Operating Systems.	Cognitive Knowledge Level: Apply
101004/IT522S.6	Implement client server network programming operations.	Cognitive Knowledge Level: Apply

**CO-PO AND CO-PSO MAPPING**

	P01	PO2	P03	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
101004/IT522S.1	3	2	3	-	-	-	-	1	-	1	-	2	3	3	2



101004/ IT522S. 2	3	2	3	-	-	-	-	1	-	1	-	2	2	2	-
101004/ IT522S. 3	2	2	3	2	-	-	-	1	-	1	-	2	2	2	-
101004/ IT522S. 4	2	2	3	2	-	-	-	1	-	1	-	2	1	2	-
101004/ IT522S. 5	1	1	2	2	-	-	-	1	-	1	-	1	-	2	-
101004/ IT522S. 6	1	1	2	2	-	-	-	1	-	1	-	1	-	2	-
101004/ IT522S overall	2	2	2	2	-	2	-	1	-	1	-	2	2	2	2

1-Low (L)    2-Medium (M)    3-High (H)

#### JUSTIFICATIONS FOR THE MAPPING

Mapping	LOW/MEDIUM/HIGH	Justification
101004/IT522S.1-PO1	HIGH	The knowledge about different types of system calls and how to use them is important to solve complex engineering problems.
101004/IT522S.1-PO2	MEDIUM	The knowledge about different types of system calls and how to use them is important in analyzing complex engineering problems.
101004/IT522S.1-PO3	HIGH	The knowledge about different types of system calls and how to use them is needed to design efficient solutions to engineering problems
101004/IT	LOW	The knowledge about different types of system calls and

<b>522S.1-PO8</b>		how to use them makes them committed to professional ethical behaviors like honesty and integrity while doing the lab work.
<b>101004/IT 522S.1- PO10</b>	LOW	The knowledge about different types of system calls and how to use them helps to illustrate them to others and thus communicate them effectively with the engineering community through their lab records
<b>101004/IT 522S.1- PO12</b>	MEDIUM	The knowledge about different types of system calls and how to use them helps in life-long learning which enables them to adapt themselves to technological changes.
<b>101004/IT 522S.1- PSO1</b>	HIGH	The knowledge about different types of system calls and how to use them enables the students to analyze and design solutions for complex problems by understanding the concepts of Computer Science.
<b>101004/IT 522S.1- PSO2</b>	HIGH	The knowledge about different types of system calls and how to use them helps them to write efficient programs.
<b>101004/IT 522S.1- PSO3</b>	MEDIUM	The knowledge about different types of system calls and how to use them helps them to apply them in research and thereby develop innovative products useful for the society.
<b>C 101004/IT 522S.2-PO1</b>	HIGH	The knowledge of implementing Process Creation and Inter Process Communication in Operating Systems is important to solve complex engineering problems.
<b>101004/IT 522S.2-PO2</b>	MEDIUM	The knowledge of implementing Process Creation and Inter Process Communication in Operating Systems is important in analyzing complex engineering problems.
<b>101004/IT 522S.2-PO3</b>	HIGH	The knowledge of implementing Process Creation and Inter Process Communication in Operating Systems helps to design efficient solutions to engineering problems
<b>101004/IT</b>	LOW	The knowledge of implementing Process Creation and

<b>522S.2-PO8</b>		Inter Process Communication in Operating Systems makes them committed to professional ethical behaviors like honesty and integrity while doing the lab work.
<b>101004/IT 522S.2- PO10</b>	LOW	The knowledge of implementing Process Creation and Inter Process Communication in Operating Systems helps to illustrate the concept to others and thus communicate them effectively with the engineering community through their lab records
<b>101004/IT 522S.2- PO12</b>	MEDIUM	The knowledge of implementing Process Creation and Inter Process Communication in Operating Systems helps in life-long learning which enables them to adapt themselves to technological changes.
<b>101004/IT 522S.2- PSO1</b>	MEDIUM	The knowledge of implementing Process Creation and Inter Process Communication in Operating Systems enables the students to analyze and design solutions for complex problems by understanding the concepts of Computer Science.
<b>101004/IT 522S.2- PSO2</b>	MEDIUM	The knowledge of implementing Process Creation and Inter Process Communication in Operating Systems helps them to write efficient programs while designing new OS for computing devices.
<b>101004/IT 522S.3-PO1</b>	MEDIUM	The knowledge of implementing CPU Scheduling algorithms plays a role when designing new Operating systems for different applications
<b>101004/IT 522S.3-PO2</b>	MEDIUM	The knowledge of implementing CPU Scheduling algorithms is important in analyzing complex engineering problems.
<b>101004/IT 522S.3-PO3</b>	HIGH	The knowledge of implementing CPU Scheduling algorithms helps to develop efficient solutions while using them for OS design
<b>101004/IT 522S.3-PO4</b>	MEDIUM	The knowledge of implementing CPU Scheduling algorithms helps the students to adapt themselves to modern tool usage and use this knowledge to make comparisons and thus reach valid conclusions.
<b>101004/IT</b>	LOW	The knowledge of implementing CPU Scheduling

<b>522S.3-PO8</b>		algorithms makes them committed to professional ethical behaviors like honesty and integrity while doing the lab work.
<b>101004/IT 522S.3- PO10</b>	LOW	The knowledge of implementing CPU Scheduling algorithms helps to illustrate the concept to others and thus communicate them effectively with the engineering community through their lab records
<b>101004/IT 522S.3- PO12</b>	MEDIUM	The knowledge of implementing CPU Scheduling algorithms helps in life-long learning which enables them to adapt themselves to technological changes.
<b>101004/IT 522S.3- PSO1</b>	LOW	The knowledge of implementing CPU Scheduling algorithms enables the students to analyze and design efficient solutions for complex problems by understanding the concepts of Computer Science.
<b>101004/IT 522S.3- PSO2</b>	MEDIUM	The knowledge of implementing CPU Scheduling algorithms helps them to write efficient programs for process scheduling while designing new OS for computing devices.
<b>101004/IT 522S.4-PO1</b>	MEDIUM	The knowledge of implementing page replacement algorithms for memory management plays an important role when designing new Operating systems for different applications
<b>101004/IT 522S.4-PO2</b>	MEDIUM	The knowledge of implementing page replacement algorithms for memory management is important in analyzing complex engineering problems.
<b>101004/IT 522S.4-PO3</b>	HIGH	The knowledge of implementing page replacement algorithms for memory management helps to develop efficient solutions while using them for OS design
<b>101004/IT 522S.4-PO4</b>	MEDIUM	The knowledge of implementing page replacement algorithms for memory management helps the students to adapt themselves to modern tool usage and use this knowledge to make comparisons and thus reach valid conclusions
<b>101004/IT 522S.4-PO8</b>	LOW	The knowledge of implementing page replacement algorithms for memory management makes them committed to professional ethical behaviors like honesty and integrity while doing the lab work.
<b>101004/IT</b>	LOW	The knowledge of implementing page replacement

<b>522S.4-PO10</b>		algorithms for memory management algorithms helps to illustrate the concept to others and thus communicate them effectively with the engineering community through their lab records
<b>101004/IT 522S.4-PO12</b>	MEDIUM	The knowledge of implementing page replacement algorithms for memory management helps in life-long learning which enables them to adapt themselves to technological changes.
<b>101004/IT 522S.4-PSO1</b>	LOW	The knowledge of implementing page replacement algorithms for memory management enables the students to analyze and design efficient solutions for complex problems by understanding the concepts of Computer Science
<b>101004/IT 522S.4-PSO2</b>	MEDIUM	The knowledge of implementing page replacement algorithms for memory management helps them to write efficient programs using these algorithms while designing new OS for computing devices.
<b>101004/IT 522S.5-PO1</b>	LOW	The knowledge of implementing deadlock detection and avoidance algorithms plays an important role when designing new Operating systems for different applications
<b>101004/IT 522S.5-PO2</b>	LOW	The knowledge of implementing deadlock detection and avoidance algorithms is important in analyzing complex engineering problems.
<b>101004/IT 522S.5-PO3</b>	MEDIUM	The knowledge of implementing deadlock detection and avoidance algorithms helps to develop efficient solutions while using them for OS design
<b>101004/IT 522S.5-PO4</b>	MEDIUM	The knowledge of implementing deadlock detection and avoidance algorithms helps the students to adapt themselves to modern tool usage and use this knowledge to make comparisons and thus reach valid conclusions
<b>101004/IT 522S.5-PO8</b>	LOW	The knowledge of implementing deadlock detection and avoidance algorithms makes them committed to professional ethical behaviors like honesty and integrity while doing the lab work.
<b>101004/IT 522S.5-</b>	LOW	The knowledge of implementing deadlock detection and avoidance algorithms helps to illustrate the concept to others and thus communicate them effectively with the

PO10		engineering community. through their lab records
<b>101004/IT</b> <b>522S.5-</b> PO12	LOW	The knowledge of implementing deadlock detection and avoidance algorithms helps in life-long learning which enables them to adapt themselves to technological changes.
<b>101004/IT</b> <b>522S.5-</b> PSO2	MEDIUM	The knowledge of implementing deadlock detection and avoidance algorithms helps them to write efficient programs using these algorithms while designing new OS for computing devices.
<b>101004/IT</b> <b>522S.6-P01</b>	LOW	The knowledge of implementing modules for Storage Management and Disk Scheduling in Operating Systems plays a role when designing new Operating systems for different applications
<b>101004/IT</b> <b>522S.6-P02</b>	LOW	The knowledge of implementing modules for Storage Management and Disk Scheduling in Operating Systems is important in analyzing complex engineering problems.
<b>101004/IT</b> <b>522S.6-P03</b>	MEDIUM	The knowledge of implementing modules for Storage Management and Disk Scheduling in Operating Systems helps to develop efficient solutions while using them for OS design
<b>101004/IT</b> <b>522S.6-P04</b>	MEDIUM	The knowledge of implementing modules for Storage Management and Disk Scheduling in Operating Systems helps the students to adapt themselves to modern tool usage and use this knowledge to make comparisons and thus reach valid conclusions
<b>101004/IT</b> <b>522S.6-P08</b>	LOW	The knowledge of implementing modules for Storage Management and Disk Scheduling in Operating Systems makes them committed to professional ethical behaviors like honesty and integrity while doing the lab work.
<b>101004/IT</b> <b>522S.6-</b> PO10	LOW	The knowledge of implementing modules for Storage Management and Disk Scheduling in Operating Systems helps to illustrate the concept to others and thus communicate them effectively with the engineering community through their lab records

<b>101004/IT</b> <b>522S.6-</b> PO12	LOW	The knowledge of implementing modules for Storage Management and Disk Scheduling in Operating Systems helps in life-long learning which enables them to adapt themselves to technological changes.
<b>101004/IT</b> <b>522S.6-</b> PSO2	MEDIUM	The knowledge of implementing modules for Storage Management and Disk Scheduling in Operating Systems helps them to write efficient programs using these algorithms while designing new OS for computing devices.

**GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS:**

SNO	DESCRIPTION	PROPOSED ACTIONS	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Readers Writers Problem implementation	Lab Sessions	PO3	PSO2

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

**TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:**

SL NO	DESCRIPTION	PROPOSED ACTIONS	RELEVANCE WITH POs	RELEVANCE WITH PSOs
1	Thread Management using pthread library	Learning materials/ sessions	PO3, PO4	PSO2

**WEB SOURCE REFERENCES:**

1	<a href="https://www.cse.iitb.ac.in/~mythili/os/">https://www.cse.iitb.ac.in/~mythili/os/</a>
2	<a href="https://sites.google.com/cse.iitm.ac.in/os-2020/home">https://sites.google.com/cse.iitm.ac.in/os-2020/home</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

✓ CHALK & TALK	✓ HOME ASSIGNMENT	✓ WEB RESOURCES
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LCD/SMART BOARDS	STUD. SEMINARS	ADD-ON COURSES
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**ASSESSMENT METHODOLOGIES-DIRECT**

ASSIGNMENTS	STUD. SEMINARS	<input checked="" type="checkbox"/> TESTS/MODEL EXAMS	<input checked="" type="checkbox"/> UNIV. EXAMINATION
<input checked="" type="checkbox"/> STUD. LAB PRACTICES	<input checked="" type="checkbox"/> STUD. VIVA	<input type="checkbox"/> MINI/MAJOR PROJECTS	<input type="checkbox"/> CERTIFICATIONS
ADD-ON COURSES	OTHERS		

**ASSESSMENT METHODOLOGIES-INDIRECT**

<input checked="" type="checkbox"/> ASSESSMENT OF COURSE OUTCOMES (BY FEEDBACK, ONCE)	<input checked="" type="checkbox"/> STUDENT FEEDBACK ON FACULTY (ONCE)
<input type="checkbox"/> ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	<input type="checkbox"/> OTHERS

**Prepared by**
**Mathews Abraham**
**Approved by**
**HOD, IT**



**LAB CYCLE**

**OPERATING SYSTEM AND NETWORK PROGRAMMING LAB Cycle**



**DEPARTMENT OF INFORMATION TECHNOLOGY**

Course Code & Name	: 101004/IT522S , <b>OPERATING SYSTEM AND NETWORK PROGRAMMING LAB</b>
Regulations	: 2021- Autonomous
Semester	: S5
Programme	: INFORMATION TECHNOLOGY
Prepared by	: Mr. Mathews Abraham

**RAJAGIRI SCHOOL OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)**

Rajagiri Valley, Kakkanad,  
Kochi 682 039 Kerala INDIA  
Tel: +91 484 2660999

**INSTRUCTIONS TO STUDENTS**

1. Students should report to the concerned labs 5 min prior to the given timetable.
2. All the students are supposed to enter the lab with the record.
3. All the students should sit according to their allotted seats given by the respective lab in charge.

4. Do not change the terminal on which you are working.
5. All the students are expected to get at least the algorithm of the program/concept to be implemented.
6. Final experiment signature should be given by the corresponding allotted faculty and they will enter the marks in the sheet given.
7. No student will be allowed to write the model exam without completing the fair record.
8. The fair record must be certified by the coordinator/lab-in-charge before the model exam at the last page of experiments, index page, and certificate page.
9. Strictly observe the instructions given by the teacher/Lab Instructor.
10. When the experiment is completed, students should shut down the computers before leaving the lab.
11. Any damage to the lab computers will be viewed seriously.
12. Students should not leave the lab without the concerned faculty's permission.
13. Do not disturb machine Hardware / Software Setup.

**SAMPLE LABORATORY RECORD FORMAT- HANDWRITTEN (ROUGH & FAIR)**

Left Side	Right Side
Algorithm	Experiment No: <span style="float: right;">Page</span>
Program Code	Date: <span style="float: right;">Name of Experiment</span>
Output	Aim

	Theoretical Background
	Conclusion

### PROCEDURE FOR EVALUATION

Mark distribution

Total Mark	CIE	ESE	ESE Duration
150	75	75	3 hours

#### Continuous Internal Evaluation Pattern:

Attendance	:	15marks
Continuous Assessment	:	30 marks
Internal Test (Immediately before the second series test):	:	30 marks

End Semester Examination Pattern:

The following guidelines should be followed regarding award of marks

(a) Preliminary work	:	15 Marks
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### Experiment List

1. Familiarization of different types of Operating Systems Windows, Linux etc.
2. Implement fork, exec, getpid, exit, wait, close system calls.
3. Implement FCFS (Non-preemptive) scheduling algorithm and compute average waiting time and average turn-around time.

Process id	Arrival Time	Burst Time
P0	0	2
P1	1	6
P2	2	4
P3	3	9
P4	6	12

16. Implement SJF (Non-preemptive) scheduling algorithm and compute average waiting time and average turn-around time.

#### Input

Process id	Arrival Time	Burst Time
P1	1	7
P2	3	3
P3	6	2
P4	7	10
P5	9	8

17. Implement Priority Scheduling (Non-preemptive) scheduling algorithm and compute average waiting time and average turn-around time.

#### Input

Process id	Arrival Time	Burst Time	Priority
P1	0	9	5
P2	1	4	3
P3	2	5	1

P4	3	7	2
P5	4	3	4

18. Implement Round Robin scheduling algorithm and compute average waiting time and average turn-around time. (time Quantum=2 ms)

Process Id	Arrival Time(AT)	Burst Time(BT)
P1	0	4
P2	1	5
P3	2	2
P4	3	1
P5	4	6
P6	6	3

19. Implementation of IPC communication using Pipes,

20. Implementation of IPC communication using message queue

21. Implementation of IPC communication shared memory.

22. Implementation memory management scheme using first fit, Best fit, Worst fit .

Input: Memory size: 100kb, 500kb, 200kb, 300kb, 600kb  
 Process size: 212kb, 417kb, 112 kb, 426 kb

23. Consider the following snapshot of a system with five processes P0, P1, P2, P3, P4 and three resources A, B, C

- iii. What are the contents of need matrix?
- iv. Find if the system is in safe state? If it is, find the safe sequence.

Processes	Allocation			Max			Available			Need		
	A	B	C	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2			

P1	2	0	0	3	2	2						
P2	3	0	2	9	0	2						
P3	2	1	1	2	2	2						
P4	0	0	2	4	3	3						

### **Network Programing**

24. implementation of echo server
25. Implement bi directional chat communication between client and server.
26. Write a Socket program to find the factorial of a given number.
27. Write a Socket program to find the area of a circle.

Lab In charge : Mathews Abraham

Batch incharges : Mr. Tinku Soman Jacob

Ms.Jeshmol PJ

Dr. Vidhya P M

### **OPEN QUESTIONS**

#### **Basic Programs**

1. Write a Java program to find the area of a circle.
2. Write a Java program to find the sum of digits of a number.
3. Write a Java program to find the reverse of n numbers (Use Multiple loops).
4. Write a Java program to find the frequency of a given character in a string.

#### **2: Arrays**

5. Write a Java program to multiply two given matrices.
6. Write a Java program to find the largest element in a matrix and its transpose.

#### **3: Graphics Programming**

7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time. No light is on when the program starts.

#### **4: Data Structures**

1. Write a Java program that implements a binary search algorithm.
2. Write a Java program to test if a given string contains the specified sequence of char values.  
b) Write a Java program to search color in given ArrayList of colors. c) Write a Java program to search if a hashmap contains a mapping for the specified key, specified value
3. Bank want to automate the process of managing their accounts- the bank provides following facilities: Opening a new account, Deposit amount, Withdraw amount, View the account details. The account holder has to provide with following information while opening account: account number, account type- savings, current, Account holders name, address, current balance etc
4. The payroll system of an organization keeps track of salaries of employees; the employee may be a permanent employee, daily wager, as per their status they will get bonus and increments.
5. Write a file handling program in Java with reader/writer. Replace a given word in a file with another word.
6. Write a Java program that implements the binary search algorithm.
7. Write a Java program that implements a multi-threaded program which has three threads. First thread generates a random integer every 1 second. If the value is even, second thread computes the square of the number and prints. If the value is odd the third thread will print the value of cube of the number.
8. Write a Java program that implements a stack.

#### **ADVANCED QUESTIONS**

1. Read a number through command line arguments. If user enters minus number throw NegativeNumberException which is a user defined exception.
2. Create BankAccount with 500 Rs Minimum Balance, Deposit Amount, Withdraw Amount and Also Throws LessBalanceException. - Class Called LessBalanceException Which returns the Statement that Says WithDraw Amount(\_Rs) is Not Valid. Write a Java Program that has a

Class Which Creates Account, perform Deposit Money and Tries to Withdraw more Money Which Generates a LessBalanceException. Take Appropriate Action for the Same

3. Write a program for java online test (Minimum 3 questions). And display score.
4. Implement an ATM using GUI & MySQL.
5. Develop a GUI Based application to check whether the given number is prime or not.
6. Develop a GUI Based application to find the sum of the digits of a number.
7. Develop a GUI Based application to check if a given number is armstrong or not.
8. Develop a Java program to implement binary search.
9. Develop a Java program to implement a stack.
10. Develop a Java program to implement a queue.
11. Develop a Java program to implement a circular queue.
12. Develop a GUI Based application to determine if a given word is palindrome or not.
13. Develop a GUI Based application to count the number of words in a given file.



# **101004/IT522T**

# **Web Application**

# **Development Lab**

### COURSE INFORMATION SHEET

PROGRAMME: Information Technology	DEGREE: BTECH
COURSE: Web Application Development Lab	SEMESTER: Fifth CREDITS: 2
COURSE CODE: 101004/IT522T REGULATION: 2021	COURSE TYPE: CORE
COURSE AREA/DOMAIN: Programming	CONTACT HOURS: 3 Lab hours/Week
CORRESPONDING LAB COURSE CODE (IF ANY):	LAB COURSE NAME:NA

#### SYLLABUS:

1. Install, setup Integrated Development Environment (IDE) for web development.
2. Create a web page with all possible elements of HTML5
3. Create a web page with all types of Cascading style sheets
4. Create a Responsive Web page with HTML and CSS
5. Create Responsive web page with Bootstrap
6. Programs to demonstrate JavaScript array, object and functions
7. Client Side Scripts for Form Validation using JavaScript
8. Programs to familiarise ES6 concepts
9. Programs to demonstrate DOM and event handling.
10. Programs using AJAX with HTML, XML and JSON data
11. Programs to familiarise JQuery.
12. Create a website with HTML, CSS and Javascript (implement Ajax)
13. Programs to familiarise Server Side Scripting using Node JS
14. Programs using MongoDB database with Node JS
15. Develop a web site with HTML, CSS, Javascript/JQuery, Node JS and MongoDB

#### TEXT/REFERENCEBOOKS:

T/R	BOOK TITLE/AUTHORS/PUBLICATION
R1	Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, "Internet and World Wide Web How To Program", 5/E, Pearson Education, 2012
R2	Jon Duckett, "HTML and CSS: Design and Build Websites", Wiley
R3	Jon Duckett, "JavaScript and JQuery: Interactive Front-End Web Development", Wiley
R4	Nicholas C. Zakas, "Understanding ECMAScript 6: The Definitive Guide for JavaScript

	Developers”
R5	Alex Young, Marc Harter, “Node js in practice”, Manning
R6	Json Krol , “Web Development with mongodb and node js”, Packt
R7	Krishna Rungta , “Node JS: learn in one day”

**COURSE PRE-REQUISITES:**

C.CODE	COURSE NAME	DESCRIPTION	SEM
101004/IT522T	Basics of Programming, ITT301 Web Application Development	Programming Fundamentals	S5

**COURSE OBJECTIVES:**

Web Application Development Lab is intended to deliver hands -on experience of Web Application Development with HTML, CSS, JavaScript, JQuery, Node JS and Mongo DB thereby equipping them to develop real time web applications

**COURSE OUTCOMES:**

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

CO_No	Course Outcome(CO)	Bloom’s Category
CO1	Infer the structure of HTML elements in a webpage	level 2: Understand
CO2	Build Webpages using HTML and CSS	level 6:Create
CO3	Utilize JavaScript to add functionality to webpages	level 6:Create
CO4	Implement different Ajax & JQuery functionalities in Web development	level 6:Create
CO5	Develop a web applications using Node JS and MongoDB	level 6:Create

**CO-PO AND CO-PSO MAPPING**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	1	2		2									3		3
CO2	1	2		2									3		3
CO3	2	2		2									3		3
CO4	2	2		3									3		3
CO5	2	3	1	3								2	3	2	3

**JUSTIFICATIONS FOR CO-PO MAPPING**

MAPPING	LOW/ME DIUM/HI GH	JUSTIFICATION
CO1-PO1	L	The knowledge in designing methodologies helps in designing solutions for engineering fundamentals.
CO1-PO2	M	The knowledge in designing methodologies helps in designing solutions for engineering sciences.
CO1-PO4	M	The knowledge in designing components helps in designing system components.
CO1-PSO1	H	The knowledge in HTML5 elements helps in acquiring skills to design and develop in high level programming languages.
CO1-PSO3	H	The knowledge in HTML5 elements helps in developing strong skills in design and implementing IT solutions in different domains.
CO2-PO1	L	The knowledge in designing styles methodologies helps in designing solutions for engineering fundamentals.
CO2-PO2	M	The knowledge in designing styles methodologies helps in designing solutions for engineering sciences.
CO2-PO4	M	The knowledge in designing style components helps in designing system components.
CO2-PSO1	H	The knowledge in CSS helps in acquiring skills to design and develop in high level programming languages
CO2-PSO3	H	The knowledge in CSS elements helps in developing strong skills in design and implementing IT solutions in different domains.
CO3-PO1	M	The knowledge in JavaScript programming helps in designing solutions for complex engineering problems.
CO3-PO2	M	The knowledge in JavaScript programming helps in formulating and analyzing complex engineering problems for engineering sciences.

C03-P04	M	The knowledge in JavaScript programming helps to design solutions for complex engineering problems.
C03-PS01	H	The knowledge in JavaScript helps in acquiring skills to design and develop in high level programming languages
C03-PS03	H	The knowledge in JavaScript elements helps in developing strong skills in design and implementing IT solutions in different domains.
C04-P01	M	The knowledge in Ajax & JQuery helps in designing solutions for complex engineering problems.
C04-P02	M	The knowledge in Ajax & JQuery helps in formulating and analyzing complex engineering problems for engineering sciences.
C04-P04	H	The knowledge in Ajax & JQuery helps to design system components.
C04-P012	L	The use of Ajax & JQuery helps to recognize the need for broadest changes in context of technology.
C04-PS01	H	The use of Ajax & JQuery helps in acquiring skills to design and develop in high level programming languages
C04-PS03	H	The knowledge in Ajax & JQuery helps in developing strong skills in design and implementing IT solutions in different domains.
C05-P01	M	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps in designing engineering specialization for complex engineering problems.
C05-P02	H	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps in formulating and analyzing complex engineering problems for engineering sciences.
C05-P03	L	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps to design system components.
C05-P04	H	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps in research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
C05-P012	M	The use of HTML, CSS, JavaScript, Node JS and MongoDB helps to recognize the need for broadest changes in context of technology.
C05-PS01	H	The use of HTML, CSS, JavaScript, Node JS and MongoDB helps in acquiring skills to design and develop in high level programming languages
C05-PS02	M	The use of Node JS and MongoDB contribute engineering skills in database design.
C05-PS03	H	The knowledge in HTML, CSS, JavaScript, Node JS and MongoDB helps in developing strong skills in design and implementing IT solutions in different domains.

**GAPS IN THE SYLLABUS - TO MEET INDUSTRY/PROFESSION REQUIREMENTS: NIL**

SNO	DESCRIPTION	PO	PSO
1	Analyzing the performance of web application	7,11	1,2,3

PROPOSED ACTIONS: TOPICS BEYOND SYLLABUS/ASSIGNMENT/INDUSTRY VISIT/GUEST LECTURER/NPTEL ETC

**TOPICS BEYOND SYLLABUS/ADVANCED TOPICS/DESIGN:**

SN O	DESCRIPTION	PO	PSO
1	OWASP	1,3,4	1,2,3

**WEB SOURCE REFERENCES:**

1	<a href="https://www.w3schools.com/html/">https://www.w3schools.com/html/</a>
2	<a href="https://www.w3schools.com/css/default.asp">https://www.w3schools.com/css/default.asp</a>
3	<a href="https://www.w3schools.com/js/default.asp">https://www.w3schools.com/js/default.asp</a>
4	<a href="https://www.w3schools.com/xml/ajax_intro.asp">https://www.w3schools.com/xml/ajax_intro.asp</a>
5	<a href="https://www.tutorialspoint.com/mongodb/index.htm">https://www.tutorialspoint.com/mongodb/index.htm</a>

**DELIVERY/INSTRUCTIONAL METHODOLOGIES:**

CHALK & TALK	STUD. ASSIGNMENT	WEB RESOURCES
LCD/SMART BOARDS	STUD. SEMINARS	ADD-ON COURSES

**ASSESSMENT METHODOLOGIES-DIRECT**

ASSIGNMENTS	STUD. SEMINARS	✓ TESTS/MODEL EXAMS	✓ UNIV. EXAMINATION
✓ STUD. LABPRACTICES	✓ STUD.VIVA	MINI/MAJOR PROJECTS	CERTIFICATIONS
ADD-ON COURSES	OTHERS		

**ASSESSMENT METHODOLOGIES-INDIRECT**

✓ ASSESSMENT OF COURSE OUTCOMES(BY FEEDBACK, ONCE)	✓ STUDENT FEEDBACK ON FACULTY
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	(TWICE)
ASSESSMENT OF MINI/MAJOR PROJECTS BY EXT. EXPERTS	OTHERS

Prepared by  
**Mr. Tinku Soman Jacob**

Approved by  
**(H.O.D)**

### COURSE PLAN

No	Topic	Week No
1	Install, setup Integrated Development Environment (IDE) for web development.	Week 1
2	Create a web page with all possible elements of HTML5.	Week 2
3	Create a web page with all types of Cascading style sheets.	Week 3
4	Create a Responsive Web page with HTML and CSS.	Week 4
5	Create Responsive web page with Bootstrap.	Week 5
6	Programs to demonstrate JavaScript array, object and functions.	Week 6
7	Client Side Scripts for Form Validation using JavaScript.	Week 7
8	Programs to familiarize ES6 concepts.	Week 8
9	Programs to demonstrate DOM and event handling.	Week 9
10	Programs using AJAX with HTML, XML and JSON data.	Week 10
11	Programs to familiarize JQuery.	Week 11
12	Create a website with HTML, CSS and JavaScript (implement Ajax).	Week 12
13	Programs to familiarise Server Side Scripting using Node JS.	Week 13
14	Programs using MongoDB database with Node JS.	Week 14
15	Develop a web site with HTML, CSS, Javascript/JQuery, Node JS and MongoDB.	Week 15

## Lab Cycle and Schedule

### 1. WEBSITE USING HTML

Create a website which demonstrates the usage of following HTML tags:

- Headings
- Paragraphs
- Image
- Lists
- Anchor
- Forms

### 2. WEBSITE USING HTML AND CSS

Develop a website for Online Bus Ticket Booking having pages:

- a) Home Page:
  - Navbar
  - Banner image
  - Contents
  - Footer
- b) Ticket Booking
  - Book Ticket
  - Booking Details
- c) About Us



3. Develop a **RESPONSIVE WEBSITE WITH BOOTSTRAP** for Online Bus Ticket Booking.

#### 4. JAVASCRIPT ARRAY, OBJECT AND FUNCTIONS

a) Write a Javascript program to find the sum of array elements using function

b) Write a Javascript program to sort a list of elements using Bubble Sort.

c) Write a Javascript program to calculate grades of students and average grade of a class (use prompt to get input)

#### 5. ES6 concepts

a) Write an ES6 program to find the maximum, minimum, sum and average of numbers in array which is accept from user's keyboard using for loop, arrow functions.

b) Write an ES6 program to reverse a string using for loop, arrow functions.

c) Write a simple ES6 program that receive an array of numbers and return a newarray with distinct elements.

#### 6. FORM VALIDATION USING JAVASCRIPT

Write the client side scripts for Validating HTML Registration (Form Validation) Using JavaScript.

#### 7. DOM & EVENT HANDLING

a) Write a JS program to implement the event bubbling

b) Write a JS program to find the sum of two number in the button click event.

c) Create a button named 'change color' and change its foreground color to red when

mouse over and its back ground color changes to green when mouse out of Button  
.Use DOM Event listener property.

### 8. AJAX with HTML, XML and JSON data

Write a program using AJAX to retrieve Book title, Author and Price with HTML, XML and JSON data

### 9. JQuery

Implement JQuery inserting elements (.before(),.after(), .prepend() and .append()).

10. Develop a web site with HTML, CSS, Javascript/JQuery, Node JS and MongoDB.

(Groupwise microproject)

**a) Student Management System**

**b) Library Management System**

**c) Hospital Management System**

**d) Supply Chain Management System**

## Open Experiments

1. Write an HTML program to create the following table :

Class	Subject 1	Subject 2	Subject 3
BCA I	Visual Basic	PC Software	Electronics
BCA II	C++	DBMS	English
BCA III	Java	Multimedia	CSA

2. Write an HTML program to create the following list:

- (I) C
  - (II) C++
  - (III) Fortran
  - (IV) COBOL
3. Write an HTML program to create the following list:
    1. Java
    2. Visual Basic
    3. BASIC
    4. COBOL
  4. Write an HTML program to demonstrate hyper linking between two web pages. Create a marquee and also insert an image in the page.
  5. Write a program to demonstrate date validation form.
  6. Design a web-page to if the user right clicks on the document area and alert box should appear instead of the shortcut menu.

### **Advanced Questions**

1. Write a script to get largest value in array.
2. Write a script to print sum and multiplication of two numbers.
3. Write a program to print date using java script.
4. Write a program to demonstrate date validation form.
5. Design and develop a simple calculator for addition, subtraction, multiplication and division using HTML, CSS & JavaScript. Also check various error conditions and display the result accordingly.
6. Design and develop an online college voting system using HTML, CSS and JavaScript by validating fields like student name, academic email address, gender, branch, semester and candidate name. Also report the successful submission on screen.
7. Design and develop an online quiz system using HTML, CSS and JavaScript and publish the result after the final submit.

8. Design and develop a simple webpage using HTML and CSS to promote a commodity with all possible page structure elements.
9. Design & Develop static pages using HTML & CSS for an online book store showing book title, author name and price. Users are given the facility to purchase each book by providing valid name, phone number, email address and payment-mode. Report the successful submission on screen.