J.J COLLEGE OF ENGINEERING AND TECHNOLOGY

Approved by AICTE | Affiliated to Anna University | ISO 9001 : 2015 Certified
Accredited by NAAC with A Grade

SOWDAMBIKAA GROUP OF INSTITUTIONS

ESTD. 1994

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

EC-COUNCIL

30 YEARS OF EXCELLENCE

TÜVRheinland CERTIFIED

NATIONAL CYBER SAFETY AND SECURITY STANDARDS

DEPARTMENT OF INFORMATION TECHNOLOGY

IT3501 - FULLSTACK WEB DEVELOPMENT

QUESTION BANK

R-2021

INSTITUTE VISION & MISSION

VISION:

To become a globally recognized **'Centre of Academic Excellence'** providing Quality Education to all students.

MISSION:

To provide Quality Education in the fields of Engineering, Management, Information Technology and other Engineering areas.

DEPARTMENT VISION & MISSION

VISION:

To prepare technically skilled and competent intellectual IT professional graduates to meet the challenges in the IT industry.

MISSION:

M1: To produce technologically competent graduates to be front runner in their profession.

M2: To provide state-of-the-art facilities and laboratories so as to enhance excellence in teaching and learning process.

M3: To provide need-based quality training programmes in the field of Information Technology.

M4: Enhance the students' IT knowledge in the latest technologies by organizing technical programs and encouraging students to make them present papers and participate in technical events.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1	Demonstrate technical competence with analytical and critical thinking to understand and meet the diversified requirements of industry, academia and research.
PEO2	Exhibit technical leadership, team skills and entrepreneurship skills to provide business solutions to real world problems.
PEO3	Work in multi-disciplinary industries with social and environmental responsibility, work ethics and adaptability to address complex engineering and social problems.
PEO4	Pursue lifelong learning, use cutting edge technologies and involve in applied research to design optimal solutions.

PROGRAM OUTCOMES (POs):

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 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 the 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 to reason in formed 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 in dependent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1	Have proficiency in programming skills to design, develop and apply appropriate techniques, to solve complex engineering problems.
PSO2	Have knowledge to build, automate and manage business solutions using cutting edge technologies.
PSO3	Have excitement towards research in applied computer technologies.

IT3501	FULL STACK WEB DEVELOPMENT	L T P C
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COURSE OBJECTIVES:

- To understand the various components of full stack development
- To learn Node.js features and applications
- To develop applications with MongoDB
- To understand the role of Angular and Express in web applications
- To develop simple web applications with React

UNIT I BASICS OF FULL STACK 9

Understanding the Basic Web Development Framework - User - Browser – Webserver - Backend Services – MVC Architecture - Understanding the different stacks –The role of Express – Angular – Node – Mongo DB – React

UNIT II NODE JS 9

Basics of Node JS – Installation – Working with Node packages – Using Node package manager – Creating a simple Node.js application – Using Events – Listeners –Timers - Callbacks – Handling Data I/O – Implementing HTTP services in Node.js

UNIT III MONGO DB 9

Understanding NoSQL and MongoDB – Building MongoDB Environment – User accounts – Access control – Administering databases – Managing collections – Connecting to MongoDB from Node.js – simple applications

UNIT IV EXPRESS AND ANGULAR 9

Implementing Express in Node.js - Configuring routes - Using Request and Response objects - Angular - Typescript - Angular Components - Expressions - Data binding - Built-in directives

UNIT V REACT 9

MERN STACK – Basic React applications – React Components – React State – Express REST APIs - Modularization and Webpack - Routing with React Router – Server-side rendering

TOTAL:45 PERIODS

COURSE OUTCOMES

On completion of this course, the students expected to be able to:	
CO1	Understand the various stacks available for web application development
CO2	Use Node.js for application development
CO3	Develop applications with MongoDB
CO4	Use the features of Angular and Express
CO5	Develop React applications

CO's – PO's & PSO's MAPPING

Correlation of COs with POs / PSOs															
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	-	-	-	-	-	-	1	1	1	1	1	1	-
CO2	3	3	3	3	2	1	-	-	2	-	2	3	2	2	1
CO3	3	3	2	2	2	2	-	-	2	2	2	3	2	2	1
CO4	3	3	2	2	2	1	-	-	1	1	2	2	2	1	1
CO5	3	3	3	3	3	1	-	-	-	-	2	2	2	2	1
AVG	3	3	2	2	2	1	-	-	1	1	2	2	2	2	1
3 – High; 2 – Medium; 1 – Low,"-"No Correlation															

TEXT BOOKS:

1. Brad Dayley, Brendan Dayley, Caleb Dayley, 'Node.js, MongoDB and Angular Web Development', Addison-Wesley, Second Edition, 2018
2. Vasan Subramanian, 'Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node', Second Edition, Apress, 2019.

REFERENCE BOOKS:

1. Chris Northwood, 'The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', Apress; 1st edition, 2018
2. Kirupa Chinnathambi, 'Learning React: A Hands-On Guide to Building Web Applications Using React and Redux', Addison-Wesley Professional, 2nd edition, 2018
3. https://www.tutorialspoint.com/the_full_stack_web_development/index.asp
4. https://www.coursera.org/specializations/full-stack-react
5. https://www.udemy.com/course/the-full-stack-web-development/

UNIT– I
BASICS OF FULL STACK

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1.	Compare between browser and web server.	CO1	Evaluate	Medium
2.	Why do we need backend services in web development?	CO1	Understand	Low
3.	Write the role of a User in the web development framework.	CO1	Understand	Low
4.	Why would you use flex-wrap CSS property and what values can it have?	CO1	Understand	Low
5.	State the difference between GET and POST.	CO1	Remember	Medium
6.	List some companies involved in using full stack technologies.	CO1	Remember	Low
7.	Draw an MVC pattern for a SQL query execution.	CO1	Create	High
8.	Point out some real time web applications along with the full stack technologies used.	CO1	Remember	Medium
9.	What is the role of a Webserver in the web development process?	CO1	Understand	Low
10.	Illustrate backend services and their significance in web development.	CO1	Analyze	High

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**

1.	With neat diagram illustrate in detail about MVC architecture design pattern of web development with its component and design participate.	CO1	Analyze	High
2.	Describe the entire process of Full Stack Web Development, starting from the User's request to displaying the final output on the Browser. Highlight the role of each component involved in the process.	CO1	Understand	Medium
3.	Compare and contrast it with traditional relational databases like MySQL in terms of data storage, querying, scalability, and flexibility.	CO1	Evaluate	High
4.	What is full stack development? Assume that you are assigned the responsibility of developing a web application for online booking for vehicle services and washing. As a web developer clearly explains how to choose a technology stack for this web application	CO1	Understand	Medium
5.	Compare and contrast of MEAN stack and MERN stack.	CO1	Evaluate	Medium
6.	What technologies are used for full stack developer? develop a web based online course registration system using full stack technologies considering client-side and server-side components.	CO1	Create	High
7.	Explain in detail about web development stacks and their roles in building functional web application.	CO1	Understand	Medium
8.	Compare and contrast the traditional three-tier architecture with the Full Stack Web Development architecture. Discuss the advantages and disadvantages of each approach.	CO1	Evaluate	High

UNIT – II
NODE JS

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1.	Write short notes on node package manager (NPM).	CO2	Understand	Low
2.	Compare between event call backs and threaded models.	CO2	Evaluate	Medium
3.	Give the syntax of any 5 NPM basic commands.	CO2	Understand	Low
4.	Mention the built-in modules that comes with Node.js.	CO2	Remember	Medium
5.	Give an example of blocking I/O and its impact on node.js.	CO2	Understand	Low
6.	Write the node.js event model process.	CO2	Understand	Medium
7.	How to process query strings and form parameters?	CO2	Understand	Low
8.	Compare client-side programming and server-side programming.	CO2	Evaluate	Medium
9.	How to connect Node.js to a Mongo DB database?	CO2	Understand	Low
10.	What is Event Emitter?	CO2	Understand	Low

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1.	Describe about the methods of reading and writing buffer objects with an example.	CO2	Understand	Medium
2.	Discuss about readable and writable streams with code snippets.	CO2	Understand	Medium
3.	Illustrate in detail about processing query strings and form parameters with request, response, and server object examples.	CO2	Analyze	High
4.	Develop an application to demonstrate file upload process in Node.js.	CO2	Create	High
5.	Building on the HTTP server, explore the concept of middleware in Node.js. Describe how middleware functions work and their role in request processing and response handling.	CO2	Create	High
6.	Describe the different approaches to read and write files, and highlight the benefits of using streams for large-scale I/O operations.	CO2	Understand	Medium
7.	Explain the concept of a call back hell and how it can be mitigated.	CO2	Understand	Medium
8.	Discuss the implementation of HTTP Clients and Servers in node.js.	CO2	Understand	Medium
9.	Describe the entire process of implementing HTTP Services in node.js.	CO2	Understand	Medium

UNIT – III

MONGO DB

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1.	List the Mongo DB data types with its description.	CO3	Remember	Low
2	How to see user roles in Mongo DB?	CO3	Understand	Low
3	Write the features of No SQL.	CO3	Understand	Low
4	What is map reduce?	CO3	Understand	Low
5	What is JSON?	CO3	Understand	Low
6	Define collection and document.	CO3	Remember	Medium
7	What is Normalizing Data?	CO3	Understand	Low
8	Define Capped Collections.	CO3	Remember	Medium
9.	What is TTL? How TTL can be implemented in MongoDB? TTL or time-to live value for documents in each of your collections	CO3	Understand	Low

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	Explain in details about query object to fetch the data from Mongo DB with relevant code snippets.	CO3	Understand	Medium
2	Illustrate about sorting result set and finding distinct values from a Mongo DB collection.	CO3	Analyze	Medium
3	Design and entire database structure for an ecommerce application for Mongo DB.	CO3	Create	High
4	Create a Node JS server that create, read, updates and delete student's details in Mongo DB database	CO3	Create	High
5	Explain the way Mongo DB is used to list, create and remove users from the mongo DB shell with examples.	CO3	Understand	Medium
6	Elaborate the different methods of document, collection, and database modelling that can be used in Mongo	CO3	Understand	Medium
7	Explain the way Mongo DB is used to add users to configure access control	CO3	Create	High

UNIT – IV

EXPRESS AND ANGULAR

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1.	Different between typescript and java script.	CO4	Understand	Low
2.	What is the importance of track by in the ng-repeat directives in angular?	CO4	Understand	Low
3.	What is Routing?	CO4	Understand	Low
4.	What is the syntax of Express module?	CO4	Understand	Low
5.	What are the methods for implementing an express module? Give an example.	CO4	Understand	Low
6.	List any five methods of Response Object.	CO4	Remember	Low
7.	How to write a class in Type Script?	CO4	Understand	Low
8.	What is Dependency Injection?	CO4	Understand	Low
9.	List the rules to implement Angular.	CO4	Remember	Low
10.	How to handle the HTTP request by the HTTP Server?	CO4	Understand	Low

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1.	Illustrate in detail about request and response object in express is with relevant example.	CO4	Analyze	Medium
2.	Explain about configuring routers to implement express in node.js.	CO4	Understand	Medium
3.	Describe in details about angular component its lifecycle and style with example code snippets.	CO4	Understand	Medium
4.	Discuss the role of typescript in angular application.	CO4	Understand	Medium
5.	Explain the concept of applying router parameter in express http server.	CO4	Understand	Medium
6.	Explain the commonly used properties available in the request and response object with example.	CO4	Understand	Medium
7.	Describe the interface class and inherence in typescript with necessary examples.	CO4	Understand	Medium
8.	Discuss the role of angular CLI in development also provide examples of common CLI command and their use case in managing angular project.	CO4	Understand	Medium
9.	Implement the basic angular application. Include a component, a module, and a bootstrapper.	CO4	Create	High
10.	Summarizes the step to create the basic angular a application.	CO4	Create	High

UNIT – V

REACT

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1.	In the render function, instead of returning one , try returning two Elements placed one after the other. what happens? and why?	CO5	Understand	Low
2.	Differentiate between react router parameter and query parameter.	CO5	Understand	Medium
3.	What is Bootstrap and React-Bootstrap?	CO5	Understand	Low
4.	Define Virtual DOM.	CO5	Remember	Low
5.	What is One-way Data Binding?	CO5	Understand	Low
6.	Difference between Functional and Class Components.	CO5	Understand	Medium
7.	What is Hydration?	CO5	Understand	Low
8.	What is modularization in react?	CO5	Understand	Low
9.	What is JFX?	CO5	Understand	Low
10.	What are the differences between props and state?	CO5	Understand	Low

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1.	Describe details about react component and react status with example and code snippets.	CO5	Understand	Medium
2.	i) Explain about modularization in react using web pack tool. ii) Write a step by step producer in enable server side rendering for a react APP.	CO5	Understand	Medium
3	Discuss about express rest API's methods with an example.	CO5	Understand	Medium
4.	Describe the steps of installation of React JS. Write a program using React JS.	CO5	Understand	Medium
5.	Explain about the MERN stack.	CO5	Understand	Medium
6.	Design and implement an Express REST API for a simple Task Management Application.	CO5	Create	High
7.	Develop a checklist using React JS classes and component.	CO5	Create	High
8.	Demonstrate the MERN stack facilitate a development of basic react application.	CO5	Create	High
9.	Explain the concept of react state and its significant in building dynamic web application using the MERN stack.	CO5	Understand	Medium
10.	Develop a login page using React JS classes and component.	CO5	Create	High

THANK YOU

ALL THE BEST