

**Syllabus Details**

Syllabus ID:	12175
Syllabus Name:	<b>Server-Side development with NodeJS, Express, and MongoDB_Phát triển Server-Side với NodeJS, Express và MongoDB</b>
Course Name English:	<b>Server-Side development with NodeJS, Express, and MongoDB</b>
Subject Code:	<b>SDN302</b>
NoCredit:	3
Degree Level:	Bachelor
Time Allocation:	Study hour (150h) = 45h contact hours + 1 h final exam + 85' practical exam + 104h self-study
Pre-Requisite:	DBI202, FER202
Description:	<p>This course tackles all the problems related to NodeJS-based web servers. Contents to be implemented include:</p> <ul style="list-style-type: none"><li>- Overview of Web protocols: HTTP and HTTPS.</li><li>- Introduction of NodeJS and frameworks such as ExpressJS, NestJS, Hono to build a web server.</li><li>- Introduction of simple templating languages such as EJB and HandleBar .</li><li>- Deploy the application on a web server with basic CRUD operations. Work with NoSQL databases, specifically MongoDB and Mongoose, to access MongoDB from NodeJS.</li><li>- Overview of REST and building a RESTful API.</li><li>- Learn Authentication and security-related issues for web applications.</li><li>- Integrate React app with server NodeJs</li><li>- Deploy server-based applications with Hosting Services</li></ul>
StudentTasks:	<ul style="list-style-type: none"><li>- Students must attend at least 80% of contact slots in order to be accepted to the final examination.</li><li>- Student is responsible to do all exercises given by instructor in class or at home and submit on time</li></ul>

	- Constantly follow announcements on FU CMS at <a href="https://cms.hn.fpt.edu.vn/">https://cms.hn.fpt.edu.vn/</a> and FU FLM at <a href="https://flm.fpt.edu.vn/">https://flm.fpt.edu.vn/</a> for up-to-date course information regarding assignment submission and feedback on assignments and project work.
Tools:	- Visual Studio Code ( <a href="https://code.visualstudio.com">https://code.visualstudio.com</a> ) - Postman - MongoDB Compass - Internet
Scoring Scale:	10
DecisionNo MM/dd/yyyy:	1286/QĐ-ĐHFPT dated 11/22/2024
IsApproved:	<b>True</b>
Note:	
MinAvgMarkToPass:	5
IsActive:	True
ApprovedDate:	11/22/2024

9 material(s)

MaterialDescription	Author	Publisher	PublishedDate	Edition	ISBN	IsMainMaterial	IsHardCopy	IsOnline	Note
Full Stack Web Development Guide: Everything Node JS, Express, APIs, Embedded JavaScript (EJS), React JS, Database Fundamentals, SQL Databases, NoSQL ...	Sammie Smith	Independently published	2022		979-8848179330				
Ultimate Full-Stack Web Development with MERN_ Design, Build, Test and Deploy Production-Grade Web Applications with MongoDB, Express, React and NodeJS	Nabendu Biswas	Orange Education Pvt Ltd	2023		978-8119416424				

https://www.mongodb.com/									
https://ejs.co/									
https://expressjs.com/									
https://nodejs.org/docs/latest/api/									
https://handlebarsjs.com/									
NestJS - A progressive Node.js framework									
Hono - Ultrafast web framework for the Edges									

8 LO(s)

CLO Name	CLO Details
CLO1	Understand Node, Node modules, API and the Node HTTP server
CLO2	Understand Express, NestJS and Hono framework, operating principles, and methods of building a web server that supports REST API
CLO3	Be able to use the Express Generator tool to generate Express applications
CLO4	Understand MongoDB basics, develop Node applications that work with data through MongoDB and Mongoose ODM
CLO5	Be able to implement REST APIs with Express, MongoDB, Mongoose and Mongoose Population
CLO6	Be able to implement user authentication mechanisms for applications
CLO7	Be able to use Backend as a Service (BaaS) to enhance secure communication between client and server applications
CLO8	Be able to use EJB and HandleBar

[View mapping of CLOs to PLOs](#)

Session	Topic	Learning- Teaching Type	LO	ITU	Student Materials	S-Download	Student's Tasks
1	Course Introduction: 1.1 Full Stack Web Development: The Big Picture 1.2 NodeJS Introduction	Offline	CLO1	I	Slot1.1_What-is-Back-End-Development	<a href="#">SDN302_Slides_1</a>	Read textbook  Learn materrials,  Discuss key points
2	2.1 Features of node.js - Single Threaded but Highly Scalable - Event-driven and Asynchronous - Event Loop	Offline	CLO1	I, T, U	Slot1.1_What-is-Back-End-Development	<a href="#">SDN302_Slides_2</a>	Read textbook  Learn materrials,  Discuss key points
3	3.1 Node.js - Environment setup - Setting up node.js and npm - Basics of node.js and npm 3.2 Node.js - First application	Offline	CLO1	I, T, U	Slot1.2_NodeJS	<a href="#">SDN302_Slides_3</a>	Read textbook  Learn materrials,  Discuss key points
4	API: 4.1 What is API 4.2 How do APIs work? 4.3 What does an api do?	Offline	CLO1	I, T	Slot2.1_API		Read textbook  Learn materrials,  Discuss key points
5	HTTP: 5.1 HTTP Overview 5.2 Receiving an HTTP Request with Express	Offline	CLO1	U	Slot2.2_Node&Http		Read textbook  Learn materrials,  Discuss key points
6	NodeJS and HTTP: 6.1 Node.JS HTTP Module 6.2 Node.JS as a web server	Offline	CLO1	I, T, U	Slot2.2_Node&Http		Read textbook  Learn materrials,

							Discuss key points
7	EXPRESSJS: 7.1 Express Introduction 7.2 Using Express js to create your first program	Offline	CLO2	I, T, U	Slot3.1_ExpressJS		Read textbook Learn materials, Discuss key points
8	NODE and EXPRESS: 8.1 Restful routing with express 8.2 Understand and use middleware for node applications 8.3 Types of middleware in node.js 8.4 Writing express middleware 8.5 Express- Generator - Express Generator Introduction - Using Express - Generator To Create Your First Program	Offline	CLO2, CLO3	T, U	Slot3.1_ExpressJS		Read textbook Learn materials, Discuss key points
9	Nosql Databases With Mongodb: 9.1 Nosql Introduction 9.2 Document Databases (Mongodb) 9.3 Create-Read-Update-Destroy (Crud)	Offline	CLO4	T, U	Slot3.2_NoSQL-Database-With-MongoDB		Read textbook Learn materials, Discuss key points
10	10.1 Nosql Best Practices 10.2 Mongodb Mongo Shell Features 10.3 NodeJs and MongoDB	Offline	CLO4	T, U	Slot3.3_NodeJS-with-MongoDB		Read textbook Learn materials, Discuss key points
11	Mongoose: 11 What is Mongoose	Offline	CLO4	I, T, U	Slot4.1_Mongoose		Read textbook Learn materials, Discuss key points

12	Mongoose Population 12 Use Mongoose population to cross-reference users within a comment	Offline	CLO5	T, U	Slot4.1_Mongoose		Read textbook Learn materials, Discuss key points
13	13 Populate the comments with the users' information upon querying	Offline	CLO5	T, U	Slot5.1_Mongoose Population		Read textbook Learn materials, Discuss key points
14	14 Match with mongodb regex	Offline	CLO5	T, U	Slot5.1_Mongoose Population		Read textbook Learn materials, Discuss key points
15	REST API with Express, MongoDB and Mongoose: 15 Develop a full-fledged REST API server with Express, MongoDB and Mongoose	Offline	CLO5	I, T, U	Slot6_RestfulApi-with-Express-mongodb-and-mongoose		Read textbook Learn materials, Discuss key points
16	16 Implement the end-to-end solution integrating Express, Node and MongoDB	Offline	CLO5	T, U	Slot6_RestfulApi-with-Express-mongodb-and-mongoose		Read textbook Learn materials, Discuss key points
17	17 Model - View - Controller	Offline	CLO5	T, U	Slot6_RestfulApi-with-Express-mongodb-and-mongoose		Read textbook Learn materials, Discuss key points
18	ASSIGNMENT 1	Offline	CLO5	U			Read textbook Learn materials

							Redo sample examples Do Assignment 1
19	Embedded Javascript (EJS): 19 What is EJS?	Offline	CLO8	T, U	Slot7_EJS(Embbbed.Javascript)		Read textbook Learn materrials, Discuss key points
20	20 Understand what EJS does and how to use it with node and express	Offline	CLO8	I, T, U	Slot7_EJS(Embbbed.Javascript)		Read textbook Learn materrials, Discuss key points
21	21 Templating with EJS	Offline	CLO8	T, U	Slot7_EJS(Embbbed.Javascript)		Read textbook Learn materrials, Discuss key points
22	HandleBars: 22.1 What Is Handlebars? 22.2 Understand What Handlebars Does And How To Use It With Node And Express 23.3 Templating With Handlebars	Offline	CLO8	U	Slot8_HandleBars		Read textbook Learn materrials, Discuss key points
23	Progress Test - 1	Offline	CLO1,2,3,4,5,8				Do Progress Test - 1
24	ASSIGNMENT 2	Offline	CLO1,2,3,4,5,8	U			Read textbook Learn materrials Redo sample

						examples Do Assignment 2
25	Authentication And Security: 25 Authentication And Keeping User Details Secure - Password authentication - Multi-factor authentication - Biometric authentication	Offline	CLO6	T, U	Slot9-10_Authentication_and_Security	Read textbook Learn materrials, Discuss key points
26	26.1 Encryption And Useencryption To Keep Your Database Secure - Database Encryption 26.2 Hashing Passwords With Bcrypt	Offline	CLO6	T, U	Slot9-10_Authentication_and_Security	Read textbook Learn materrials, Discuss key points
27	27 Sessions And Cookies	Offline	CLO6	T, U	Slot9-10_Authentication_and_Security	Read textbook Learn materrials, Discuss key points
28	Authentication And Security (Cont'd) 28 User Authentication With Passport - Use Passport Module Together With Passport-Local	Offline	CLO6	T, U	Slot9-10_Authentication_and_Security	Read textbook Learn materrials, Discuss key points
29	29.1 use passport-local-mongoose for setting up local authentication within server 29.2 use passport together with sessions to set up user authentication	Offline	CLO6	I, T, U	Slot9-10_Authentication_and_Security	Read textbook Learn materrials, Discuss key points
30	30 Token Based Authentication	Offline	CLO6	I, T, U	Slot9-10_Authentication_and_Security	Read textbook Learn materrials,



							Discuss key points
31	HTTPS and Secure Communication: 31 Configure a secure server in Node using the core HTTPS module	Offline	CLO6	I, T, U	Slot11_HTTPS_Secure-communication		Read textbook Learn materials, Discuss key points
32	32.1 Generate the private key and public certificate and configure the HTTPS server 32.2 Redirect traffic from the insecure HTTP server to a secure HTTPS server	Offline	CLO6	T, U	Slot11_HTTPS_Secure-communication		Read textbook Learn materials, Discuss key points
33	Uploading Files: 33 Configure the Multer module to enable file uploading	Offline	CLO6	T, U	Slot12_Upload-Download-Files		Read textbook Learn materials, Discuss key points
34	34 Setup Express server to use Multer to upload files to a designated folder	Offline	CLO6	T, U	Slot12_Upload-Download-Files		Read textbook Learn materials, Discuss key points
35	Download Files: 35 Configure the module to enable file downloading	Offline	CLO6	T, U	Slot12_Upload-Download-Files		Read textbook Learn materials, Discuss key points
36	36 Setup Express server to use Multer to download files to a designated folder	Offline	CLO6	T, U	Slot12_Upload-Download-Files		Read textbook Learn materials,

							Discuss key points
37	Cross-Origin Resource Sharing: 37 Use the CORS NPM module to enable CORS support	Offline	CLO6	I, T	Slot13_Cors		Read textbook Learn materials, Discuss key points
38	38 Enable Express application to support CORS requests by configuring the CORS module	Offline	CLO6	T	Slot13_Cors		Read textbook Learn materials, Discuss key points
39	OAuth and User Authentication: 39 Use an OAuth providers for authenticating users within server	Offline	CLO6	T, U	Slot13_Cors		Read textbook Learn materials, Discuss key points
40	40 Setup server using Passport OAuth modules	Offline	CLO6	I, T	Slot13_Cors		Read textbook Learn materials, Discuss key points
41	Progress Test - 2	Offline	CLO6				Do Progress Test - 2
42	ASSIGNMENT 3	Offline	CLO6	U			Read textbook Learn materials Redo sample examples Do Assignment 3

43	Backend as a Service (BaaS): 43 Introduction	Offline	CLO7	I, T	Slot15-16_Backend-as-a-Service-(BaaS)		Read textbook Learn materials, Discuss key points
44	44 Hosting static websites with GitHub Pages	Offline	CLO7	I, T	Slot15-16_Backend-as-a-Service-(BaaS)		Read textbook Learn materials, Discuss key points
45	45 Understand and use to quickly build backend support for applications	Offline	CLO7	T	Slot15-16_Backend-as-a-Service-(BaaS)		Read textbook Learn materials, Discuss key points
46	Deployment: 46 Web hosting	Offline	CLO7	I, T, U	Slot15-16_Backend-as-a-Service-(BaaS)		Read textbook Learn materials, Discuss key points
47	47 Website Deployment	Offline	CLO7	T, U	Slot15-16_Backend-as-a-Service-(BaaS)		Read textbook Learn materials, Discuss key points
48	48 Deploying Server-Based Applications with Heroku	Offline	CLO7	I,T	Slot15-16_Backend-as-a-Service-(BaaS)		Read textbook Learn materials, Discuss key points

49	Frameworks: NestJS: 49 Introduction	Offline	CLO2	T, I, U	Slot17-18-19_Frameworks-NestJS-Hono		Read textbook Learn materials, Discuss key points
50	50 Installing	Offline	CLO2	I, T	Slot17-18-19_Frameworks-NestJS-Hono		Read textbook Learn materials, Discuss key points
51	51 Using Nestjs To Create Your First Program	Offline	CLO2	T, U	Slot17-18-19_Frameworks-NestJS-Hono		Read textbook Learn materials, Discuss key points
52	52 Overview Techniques	Offline	CLO2	I, T	Slot17-18-19_Frameworks-NestJS-Hono		Read textbook Learn materials, Discuss key points
53	53 Overview Techniques	Offline	CLO2	T, U	Slot17-18-19_Frameworks-NestJS-Hono		Read textbook Learn materials, Discuss key points
54	54 Overview Security	Offline	CLO2	T, U	Slot17-18-19_Frameworks-NestJS-Hono		Read textbook Learn materials, Discuss key points

55	Framework Hono: 55 Introduction and Installing	Offline	CLO2	I, T	Slot17-18-19_Frameworks-NestJS-Hono		Read textbook Learn materials, Discuss key points
56	56 Using Hono To Create Your First Program	Offline	CLO2	U	Slot17-18-19_Frameworks-NestJS-Hono		Read textbook Learn materials, Discuss key points
57	ASSIGNMENT 4	Offline	CLO7, 2				Read textbook Learn materials Redo sample examples Do Assigment 4
58	Project Presentation	Offline	All CLOs				Do Project Presentation
59	Project Presentation	Offline	All CLOs				Do Project Presentation
60	Progress Test - 3	Offline	CLO7, 2				Do Progress Test - 3

0 Constructive question(s)

5 assessment(s)

Category	Type	Part	Weight	Completion Criteria	Duration	CLO	Question Type	No Question	Knowledge and Skill	Grading Guide	Note
----------	------	------	--------	------------------------	----------	-----	---------------	-------------	---------------------	------------------	------

Assignment	on-going	4	20.0%	>0	Guided and reviewed in tutorial sessions; Cont. at home	All CLOs	a problem similar to real one		problem(s) to solve by programming using L01 - L08	Individual or team work, guided by instructor, submission by a given deadline	
Practical Exam	on-going	1	25.0%	4	85'	All CLOs	Preferable to be marked by scripts		problem(s) to solve by programming using L01 - L08	supervised by proctor(s) sent by exam board	
Progress test	on-going	3	15.0%	>0	20'-40'	PT1: CLO1,2,3,4,5,8 PT2: CLO6 PT3: CLO7	essay or multiple choice	15-30 if multiple choice	PT 1 L01,2,3,4,5,8 PT 2 L06 PT 3 L06, 8 Number of questions: 3-8 for each LOx	supervised by instructor	Progress test must be taken right after the last lectures of required material.  Instructor has responsibility to review the test for students after graded.
Project	on-going	1	15.0%	>0	Guided and reviewed in tutorial sessions;	All CLOs	a problem similar to real one		problem(s) to solve by programming using L01 - L08	Individual or team work, guided by instructor, submission	

					Cont. at home					by a given deadline	
Final exam	Final exam	1	25.0%	4	60'	All CLOs	multiple choice	50	all topics; more than 70% new questions (for the current semester);	supervised by proctor(s) sent by exam board	