

	MAHATMA GANDHI UNIVERSITY Kottayam, Kerala Undergraduate Programmes (HONOURS) 2025 Admission Onwards
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SYLLABUS			
SIGNATURE COURSE			
Name of the College	NSS College, Rajakumari		
Faculty/ Discipline	Electronics with Computer Technology		
Programme	BSc (Hons) Electronics with Computer Technology		
Course Coordinator	Dr. Saritha M		
Contributors			
Course Name	Building with Large Language Models		
Type of Course	DSE		
Specialization title	This Signature Course does not have a specialization.		
Course Code	MG4DSEECTA00		
Course Level	200		
Course Summary	This course bridges the gap between using an LLM in a chat interface and integrating its power into Python programs. Students will learn to work with LLM APIs (like OpenAI's API or open-source alternatives via Hugging Face). They will build their first simple AI-powered applications, such as summarization tools, basic chatbots, and content generators.		
Semester	4	Credits	4
Course Details	Learning Approach		Total Hours
	Credits	4	60
Pre-requisites, if any	Basic Programming Skills		

Course Outcomes (CO)

Number of COs		4	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Utilize LLM APIs effectively by managing API parameters and authentication.	U	PO1, PO2, PO3
2	Create reusable prompt templates and functions for common tasks	A	PO2, PO3
3	Build Simple LangChain applications with chains and memory	An, E	PO3, PO4, PO5
4	Deploy a simple, interactive AI web application.	S	PO9, PO10

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	3	3	3	-	-	-	-	-	-	-
CO 2	-	3	3	-	-	-	-	-	-	-
CO 3	-	-	3	3	3	-	-	-	-	-
CO 4	-	-	-	-	-	-	-	-	3	3

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Introduction to LLM APIs			
	1.1	Basics of APIs, RESTful principles. API Keys and Authentication.	3	["1"]
	1.2	The OpenAI Python Library vs. Requests library.	3	["1"]
	1.3	Understanding API Parameters temperature, top_p, frequency_penalty, presence_penalty.	4	["1"]
	1.4	Token Management: Counting tokens and managing costs.	4	["1"]
2	Building Simple Applications			
	2.1	Creating Reusable functions: Writing functions that call the LLM, Passing parameters to customize output, Handling errors	4	["2"]
	2.2	Working with Text files: Reading text from files, Processing long documents, Building a text summarizer	4	["2"]
	2.3	Introduction to prompt templates: Problems with hardcoding prompts, Using string formatting to create dynamic prompts, Creating prompt templates for different tasks	4	["2"]
	2.4	Managing Conversation History: How chatbots remember previous messages, Storing messages in a Python list, Building a simple command-line chatbot	4	["2"]
3	Making AI Smarter with LangChain			
	3.1	Basics of LangChain, Need for LangChain, Installing and setting up LangChain, Understanding "Chains" as pipelines	3	["3"]
	3.2	Using Prompt templates in LangChain and different LLM models: ChatPromptTemplate explained simply, Adding variables to prompts, Reusing templates across applications	3	["3"]
	3.3	Simple Chains: LLMChain: The basic building block SimpleSequentialChain: Doing one thing after another, Real example: Summary → Sentiment → Keywords	4	["3"]
	3.4	Introduction to Memory: ConversationBufferMemory: Remembering everything, Adding memory to your chains	4	["3"]

Module	Units	Course Description	Hrs	CO No.
4	Adding Tools and Deploying with Streamlit			
	4.1	Introduction to Tools: Teaching LLMs to use calculators, Search the web etc. LLM decides to use which tool	4	["4"]
	4.2	Introduction to Streamlit: Basic element, Getting user input	4	["4"]
	4.3	Building a Chat Interface: Using st.chat_message and st.chat_input Storing messages in st.session_state, Adding loading spinners	4	["4"]
	4.4	Sharing your App: Creating a requirements.txt file, Deploying to Streamlit Cloud (free) Sharing your app with friends	4	["4"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) The pedagogical approach is to bridge the gap between conceptual understanding and practical application. Students enter with basic Python knowledge and foundational prompt skills; this course transforms them into builders of functional AI applications. This course is fundamentally project-based. Students learn by "building systems that combine LLM capabilities with external knowledge" and "developing AI applications with StreamLit that utilize LLMs"
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Assessment Types	MODE OF ASSESSMENT Mode of Assessment: Practical
	A. Continuous Comprehensive Assessment (CCA) • Practical - 30 Marks Weekly experiments 5, Lab Assignments 5, Mini Project 10, Viva Voce 10
	B. End Semester Evaluation (ESE) • Practical - 70 Marks Assessment Methods – Problem Definition 10, System Design 15, Implementation 15, Innovation 10, Documentation 10, Presentation and Viva 10 Duration of Examination – 2.00 Hrs

References

- 1. Building AI and LLM Applications with Langchain and Langgraph by Mayo Oshin O'Reilly Publishers 2. A Step-by-Step Guide to Agent and Multi-Agent Workflows by Henry Finley 3. Building AI and LLM Applications with LangChain and LangGraph by Mayo Oshin & Nuno Campos

Suggested Readings

- 1. LLM Workflows for Beginners (2025). A Beginner's Guide to Building LLM Workflows with LangChain, LlamaIndex, OpenAI, n8n, Replit and Streamlit. Amazon Digital Services. 2. Dichone, P. (2025). AI & LLM Engineering Mastery: GenAI, RAG Complete Guide. Packt Publishing.

Affidavit

- We, NSS College, Rajakumari and Dr. Saritha M, retain the copyright of this syllabus and expressly prohibit its distribution in complete form to any institution outside our own.

- We, NSS College, Rajakumari, agree to appoint a new course coordinator for the proposed Building with Large Language Models in the event of the unavailability of the currently nominated coordinator. This appointment will ensure the continued coordination of course delivery, assessments, and all related academic responsibilities necessary for the successful implementation of the signature course, for as long as the college offers this programme.
- We, NSS College, Rajakumari and Dr. Saritha M, declare that no part of this signature course submitted here for approval has been taken from the course content developed by, or from any of the course titles prepared by, the BoS/expert committee in the same discipline under our University.

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