LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
L.B. REDDY NAGAR, MYLAVARAM – 521230. A.P. INDIA
Affiliated to JNTUK Kakinada & Approved by AICTE, New Delhi
Accredited By NAAC, Accredited By NBA Tier-I
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
http://www.lbrce.ac.in, Phone: 08659 – 222933, Fax: 08659 – 222931 Extn:109
DEPARTMENT OF INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOY

COURSE HANDOUT

PART-A

Name of Course Instructor : B. SARATH CHANDRA
Course Name & Code : Advanced Java (23IT04) R23
L-T-P Structure : 3-0-0 **Credits**: 3
Program/Sem/Sec : B.Tech., IT., V-Sem. A Secion, **A.Y** : 2025-26

PRE-REQUISITE: Object Oriented Programming through JAVA

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course develops programming ability of students to create dynamic web applications using server-side technology with Java Database Connectivity. Students can learn networking and remote method invocation using Java API and different Java frameworks like Spring will increase ability of students in web application development.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Understand the architecture and components of JDBC and implement database-driven applications using JDBC.
CO 2	Describe J2EE architecture and design structured web applications using J2EE containers and web components.
CO 3	Develop web applications using Servlets by managing sessions, filters, and event handling.
CO 4	Create dynamic web pages using Java Server Pages (JSP) with scripting elements, JSTL, and expression language.
CO 5	Design and build scalable web applications using Spring Framework modules such as Spring MVC, Spring AOP, and Spring DAO.

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1											3		
CO2	2	1	1										3	3	3
CO3	1		3										3	3	3
CO4	2	2											3	3	3
CO5	3	2											2	3	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

TEXT BOOKS:

T1 Black Book "Java server programming" J2EE, 1st ed., Dream Tech Publishers, 2008.
T2 Complete Reference J2EE, James Keogh, McGraw Hill publication.
T3 Professional Java Server Programming, Subrahmanyam Allamaraju, Cedric Buest, Wiley Publication.
T4 Spring in Action, 3rd edition, Craig walls, Manning Publication.

REFERENCE BOOKS:

R1	Core Java, Volume II: Advanced Features, Cay Horstmann, Gary Cornell Pearson Publication
R2	JDBC™ API Tutorial and Reference, Third Edition, Maydene Fisher, Jon Ellis, Jonathan Bruce, Addison Wesley
R3	Beginning JSP, JSF and Tomcat, Giulio Zambon, Apress

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: JDBC Programming

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	JDBC Architecture, Types of JDBC Drivers	2	30-06-2025 02-07-2025		TLM1	
2.	Introduction to major JDBC Classes and Interface	2	04-07-2025 05-07-2025		TLM1	
3.	Creating simple JDBC Application	2	07-07-2025 09-07-2025		TLM1, TLM5	
4.	Types of Statement (Statement Interface, PreparedStatement, CallableStatement)	2	11-07-2025 12-07-2025		TLM1, TLM5	
5.	Exploring ResultSet Operations	2	14-07-2025 16-07-2025		TLM1, TLM5	
6.	Batch Updates in JDBC	2	18-07-2025 19-07-2025		TLM1	
7.	Creating CRUD Application	2	21-07-2025 23-07-2025		TLM3, TLM6	
8.	Using Rowsets Objects	1	25-07-2025		TLM1	
9.	Managing Database Transaction	1	28-07-2025		TLM1	
No. of classes required to complete UNIT-I: 16				No. of classes taken:		

UNIT-II: J2EE and Web Development

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	J2EE Architecture Types, J2EE Containers	1	30-07-2025		TLM1	
11.	Types of Servers in J2EE Application	2	01-08-2025 02-08-2025		TLM1	
12.	HTTP Protocols and API	1	04-08-2025		TLM1	
13.	Request Processing in Web Application	2	06-08-2025 08-08-2025		TLM1	
14.	Web Application Structure	1	09-08-2025		TLM3	

15.	Web Containers and Web Architecture Models	1	11-08-2025		TLM1	
No. of classes required to complete UNIT-II: 08				No. of classes taken:		

UNIT-III: Servlet API and Overview

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Servlet Introduction, Servlet Life Cycle(SLC), Types of Servlet	1	13-08-2025		TLM1	
17.	Servlet Configuration with Deployment Descriptor	1	18-08-2025		TLM1	
18.	Working with ServletContext and ServletConfig Object	1	20-08-2025		TLM1, TLM5	
19.	Attributes in Servlet	1	22-08-2025		TLM1	
20.	Response and Redirection using Request Dispatcher and sendRedirect Method	1	23-08-2025		TLM1, TLM6	
21.	Filter API, Manipulating Responses using Filter API	2	01-09-2025 03-09-2025		TLM1, TLM5	
22.	Session Tracking using Cookies, HTTPSession, Hidden Form Fields and URL Rewriting	4	05-09-2025 06-09-2025 08-09-2025 10-09-2025		TLM1, TLM5	
23.	Types of Servlet Event: ContextLevel and SessionLevel	3	12-09-2025 13-09-2025 15-09-2025		TLM1	
No. of classes required to complete UNIT-III: 14				No. of classes taken:		

UNIT-IV : Java Server Pages (JSP)

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24	Introduction to JSP, Comparison with Servlet	2	17-09-2025 19-09-2025		TLM1	
25.	JSP Architecture, JSP Life Cycle	2	20-09-2025 22-09-2025		TLM1	

26.	Scripting Elements, Directives, Action Tags, Implicit Objects	3	24-09-2025 26-09-2025 27-09-2025		TLM1, TLM5	
27.	Expression Language (EL), JSP Standard Tag Libraries (JSTL)	2	29-09-2025 01-10-2025		TLM1	
28.	Custom Tag, Session Management, Exception Handling	3	03-10-2025 04-10-2025 06-10-2025		TLM1, TLM5	
29.	CRUD Application using JSP	4	08-10-2025 10-10-2025 11-10-2025 13-10-2025		TLM1, TLM6	
No. of classes required to complete UNIT-IV: 16				No. of classes taken:		

UNIT-V : Java Web Frameworks: Spring MVC

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30.	Spring Introduction, Architecture, Spring MVC Module	2	15-10-2025 17-10-2025		TLM1	
31.	Life Cycle of Bean Factory	1	18-10-2025		TLM1	
32.	Constructor Injection, Dependency Injection, Inner Beans, Aliases in Bean	1	20-10-2025		TLM1	
33.	Bean Scopes, Spring Annotations	2	22-10-2025 24-10-2025		TLM1	
34.	Spring AOP Module, Spring DAO	2	25-10-2025 27-10-2025		TLM1	
35.	Database Transaction Management	1	29-10-2025		TLM1	
36.	CRUD Operation using DAO and Spring API	2	31-10-2025 01-11-2025		TLM1	
No. of classes required to complete UNIT-V: 11				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Problem Solving
TLM2	PPT	**TLM5**	Programming
TLM3	Tutorial	**TLM6**	Assignment or Quiz
TLM7	Seminars or GD	**TLM8**	Lab Demo
TLM9	Case Study		

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**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
PO 7	**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.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**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.
PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr.B.SARATH CHANDRA	Mr.B.SARATH CHANDRA	Dr. Phaneendra K	Dr. D. Ratna Kishore
Signature				

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COURSE HANDOUT

PART-A

Name of Course Instructor : B. SARATH CHANDRA
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L-T-P Structure : 3-0-0 **Credits**: 3
Program/Sem/Sec : B.Tech., IT., V-Sem. B Secion, **A.Y** : 2025-26

PRE-REQUISITE: Object Oriented Programming through JAVA

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course develops programming ability of students to create dynamic web applications using server-side technology with Java Database Connectivity. Students can learn networking and remote method invocation using Java API and different Java frameworks like Spring will increase ability of students in web application development.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Understand the architecture and components of JDBC and implement database-driven applications using JDBC.
CO 2	Describe J2EE architecture and design structured web applications using J2EE containers and web components.
CO 3	Develop web applications using Servlets by managing sessions, filters, and event handling.
CO 4	Create dynamic web pages using Java Server Pages (JSP) with scripting elements, JSTL, and expression language.
CO 5	Design and build scalable web applications using Spring Framework modules such as Spring MVC, Spring AOP, and Spring DAO.

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1											3		
CO2	2	1	1										3	3	3
CO3	1		3										3	3	3
CO4	2	2											3	3	3
CO5	3	2											2	3	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
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REFERENCE BOOKS:

R1	Core Java, Volume II: Advanced Features, Cay Horstmann, Gary Cornell Pearson Publication
R2	JDBC™ API Tutorial and Reference, Third Edition, Maydene Fisher, Jon Ellis, Jonathan Bruce, Addison Wesley
R3	Beginning JSP, JSF and Tomcat, Giulio Zambon, Apress

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: JDBC Programming

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	JDBC Architecture, Types of JDBC Drivers	2	30-06-2025 02-07-2025		TLM1	
2.	Introduction to major JDBC Classes and Interface	2	04-07-2025 05-07-2025		TLM1	
3.	Creating simple JDBC Application	2	07-07-2025 09-07-2025		TLM1, TLM5	
4.	Types of Statement (Statement Interface, PreparedStatement, CallableStatement)	2	11-07-2025 12-07-2025		TLM1, TLM5	
5.	Exploring ResultSet Operations	2	14-07-2025 16-07-2025		TLM1, TLM5	
6.	Batch Updates in JDBC	2	18-07-2025 19-07-2025		TLM1	
7.	Creating CRUD Application	2	21-07-2025 23-07-2025		TLM3, TLM6	
8.	Using Rowsets Objects	1	25-07-2025		TLM1	
9.	Managing Database Transaction	1	28-07-2025		TLM1	
No. of classes required to complete UNIT-I: 16				No. of classes taken:		

UNIT-II: J2EE and Web Development

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
10.	J2EE Architecture Types, J2EE Containers	1	30-07-2025		TLM1	
11.	Types of Servers in J2EE Application	2	01-08-2025 02-08-2025		TLM1	
12.	HTTP Protocols and API	1	04-08-2025		TLM1	
13.	Request Processing in Web Application	2	06-08-2025 08-08-2025		TLM1	
14.	Web Application Structure	1	09-08-2025		TLM3	

15.	Web Containers and Web Architecture Models	1	11-08-2025		TLM1	
No. of classes required to complete UNIT-II: 08				No. of classes taken:		

UNIT-III: Servlet API and Overview

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16.	Servlet Introduction, Servlet Life Cycle(SLC), Types of Servlet	1	13-08-2025		TLM1	
17.	Servlet Configuration with Deployment Descriptor	1	18-08-2025		TLM1	
18.	Working with ServletContext and ServletConfig Object	1	20-08-2025		TLM1, TLM5	
19.	Attributes in Servlet	1	22-08-2025		TLM1	
20.	Response and Redirection using Request Dispatcher and sendRedirect Method	1	23-08-2025		TLM1, TLM6	
21.	Filter API, Manipulating Responses using Filter API	2	01-09-2025 03-09-2025		TLM1, TLM5	
22.	Session Tracking using Cookies, HTTPSession, Hidden Form Fields and URL Rewriting	4	05-09-2025 06-09-2025 08-09-2025 10-09-2025		TLM1, TLM5	
23.	Types of Servlet Event: ContextLevel and SessionLevel	3	12-09-2025 13-09-2025 15-09-2025		TLM1	
No. of classes required to complete UNIT-III: 14				No. of classes taken:		

UNIT-IV : Java Server Pages (JSP)

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
24	Introduction to JSP, Comparison with Servlet	2	17-09-2025 19-09-2025		TLM1	
25.	JSP Architecture, JSP Life Cycle	2	20-09-2025 22-09-2025		TLM1	

26.	Scripting Elements, Directives, Action Tags, Implicit Objects	3	24-09-2025 26-09-2025 27-09-2025		TLM1, TLM5	
27.	Expression Language (EL), JSP Standard Tag Libraries (JSTL)	2	29-09-2025 01-10-2025		TLM1	
28.	Custom Tag, Session Management, Exception Handling	3	03-10-2025 04-10-2025 06-10-2025		TLM1, TLM5	
29.	CRUD Application using JSP	4	08-10-2025 10-10-2025 11-10-2025 13-10-2025		TLM1, TLM6	
No. of classes required to complete UNIT-IV: 16				No. of classes taken:		

UNIT-V : Java Web Frameworks: Spring MVC

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
30.	Spring Introduction, Architecture, Spring MVC Module	2	15-10-2025 17-10-2025		TLM1	
31.	Life Cycle of Bean Factory	1	18-10-2025		TLM1	
32.	Constructor Injection, Dependency Injection, Inner Beans, Aliases in Bean	1	20-10-2025		TLM1	
33.	Bean Scopes, Spring Annotations	2	22-10-2025 24-10-2025		TLM1	
34.	Spring AOP Module, Spring DAO	2	25-10-2025 27-10-2025		TLM1	
35.	Database Transaction Management	1	29-10-2025		TLM1	
36.	CRUD Operation using DAO and Spring API	2	31-10-2025 01-11-2025		TLM1	
No. of classes required to complete UNIT-V: 11				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Problem Solving
TLM2	PPT	**TLM5**	Programming
TLM3	Tutorial	**TLM6**	Assignment or Quiz
TLM7	Seminars or GD	**TLM8**	Lab Demo
TLM9	Case Study		

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**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
PO 7	**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.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**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.
PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr.B.SARATH CHANDRA	Mr.B.SARATH CHANDRA	Dr. Phaneendra K	Dr. D. Ratna Kishore
Signature				

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSEHANDOUT

Part-A

PROGRAM	:	B.Tech.,V-Sem,Sec-A, IT – R23 Regulation
ACADEMIC YEAR	:	2025-2026
COURSE CODE & NAME	:	23CS07-COMPUTER NETWORKS
L-T-P STRUCTURE	:	3 0 0
COURSE CREDITS	:	3
COURSE INSTRUCTOR	:	Mr.B.Ravindra chanti babu
PRE-REQUISITES	:	Communication systems.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

In this course student will learn: COURSE OUTCOMES (COs):

The Objective of the course is to provide a foundation to understand computer networksusing layered architectures. It also helps the students to understand the various network models, addressing concepts, routing protocols and design aspects of computer networks.

Onsuccessfulcompletionofthecourse,students willbeableto:

CO1	Understandvariousnetworktypes,topologies,referencemodels,andtransmissionmedia. ((**Understand-L2)**
CO2	Examine data link layer design issues, framing techniques, error control, and flow control mechanisms. **(Analyze-L4)**
CO3	Applymultiplemediaaccesscontroltechniquesandevaluate Ethernetstandardsfornetwork communication. **(Apply-L3)**
CO4	Implement routing algorithms, congestion control techniques, and IP addressing schemes forefficient network communication. **(Apply-L3)**
CO5	Utilizetransportlayerprotocols(UDP&TCP)andapplicationlayerservices(HTTP, DNS, and Email) to enable secure and reliable data communication. **(Apply-L3)**

CourseArticulationMatrix(Correlationbetween COs& POs, PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2										1	2		
CO2	3	3		2								1	3		
CO3	2	2	3	2									3	2	
CO4	3	3	3	3								1	3	3	
CO5	3	3	2	2								1	3	3	

Note: Enter CorrelationLevels **1**or **2**or **3.** Ifthereis nocorrelation, **put'-' 1-**Slight (Low), **2 –**Moderate (Medium), **3 -** Substantial (High).

BOSAPPROVEDTEXTBOOKS:

T1 BehrouzA.Forouzan,"DataCommunicationandNetworking",McGraw-Hill,4thEdition, 2011.

T2 AndrewS.Tanenbaum,"ComputerNetworks",Pearson NewInternationalEdition,8thEdition, 2013.

BOSAPPROVEDREFERENCEBOOKS:

R1 WilliamStallings,"DataandComputerCommunication",PearsonPrenticeHallIndia,8th Edition.

R2 DouglasComer,InternetworkingwithTCP/IP,PrenticeHallofIndia,Volume1,6thEdition, 2009.

R3 RichardStevens,"TCP/IPIllustrated",Addison-Wesley,Volume1,2001.

R4 http://www.cse.iitk.ac.in/users/dheeraj/cs425/.

R5 http://www.tcpipguide.com/free/t_OSIReferenceModelLayers.htm

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I:Introduction & Physical Layer

S.No.	Topics to becovered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Discussion of Cos and CEOs of the course	1	30-06-2025		TLM1,TLM2	
2.	Introduction to Data Communication and Computer Networks	1	01-07-2025		TLM1	
3.	Network Types, LAN, MAN, WAN	1	03-07-2025		TLM2	
4.	Various Network Connection Topology s	1	05-07-2025		TLM1,TLM2	
5.	OSI model	3	07-07-2025 , 08-07-2025 & 10-07-2025		TLM1,TLM2	
6	TCP/IP Reference Model	1	14-07-2025		TLM2	
7	Comparison of the OSIand TCP/IP Reference Models	1	15-07-2025		TLM2	
8.	Introduction to Guided Media Twisted-pair cable	1	17-07-2025		TLM1,TLM2	
9.	Co axial cable, and Fiber optic cable	1	19-07-2025		TLM2	
10.	Introduction about unguided media.	1	21-07-2025		TLM2	
11	**TUTORIAL-1**	1	22-07-2025		**TLM3**	
12.	**Assignment or Quiz**	1	24-07-2025		**TLM6**	
No.of classes required to Complete UNIT-I		14				

UNIT-II: Data Link Layer

S.No.	Topics to becovered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Introduction to DLL, Datalinklayerdesign issues	1	26-07-2025		TLM2	
14.	**Framing**: fixed size framing, variable size framing,flowcontrol	1	28-07-2025		TLM2	
15.	Errorcontrol,errordetectionandcorrectioncodes	1	29-07-2025		TLM2, TLM4	

16.	CRC	1	31-07-2025		TLM2 , TLM4	
17.	Checksum: idea,one's complementinternetchecksum	1	02-08-2025		TLM2, TLM4	
18.	ServicesprovidedtoNetworkLayer	1	04-08-2025		TLM2	
19.	**ElementaryDataLink Layer protocols**: simplex protocol	1	05-08-2025		TLM2	
20.	Simplex stop and wait, Simplex protocol for Noisy Channel	1	07-08-2025		TLM2	
21.	**Slidingwindowprotocol:** Onebit, GobackN	1	09-08-2025		TLM2, TLM4	
22	Selectiverepeat-Stopandwaitprotocol	1	11-08-2025		TLM2, TLM4	
23.	**TUTORIAL-2**	1	12-08-2025		**TLM3**	
24	**Quiz-2 ASSIGNMENT-2**	1	14-08-2025		**TLM6**	
No.ofclassesrequiredtocomplete UNIT-II		12				

UNIT-III:Media Access Control: Random Access

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	ActualDate of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	ALOHA	1	16-08-2025		TLM2	
26.	Carrier sense multiple access (CSMA),CSMAwithCollisionDetection	1	18-08-2025		TLM2, TLM1	
27.	Carrier sense multiple access (CSMA),CSMAwithCollisionDetection	1	19-08-2025		TLM2, TLM1	
28.	CSMAwithCollisionAvoidance	1	21-08-2025		TLM2	
29.	**Channelization:** frequency division multiple Access (FDMA)	1	23-08-2025		TLM2	
30.	Time division multiple access(TDMA)	1	01-09-2025		TLM2, TLM1	
31.	code division multiple access(CDMA)	1	02-09-2025		TLM2	
32	**Wired LANs:** Ethernet, Ethernet Protocol	1	04-09-2025		TLM2, TLM1	
33	Standard Ethernet, Fast Ethernet(100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet.	1	06-09-2025		TLM2, TLM1	

34.	Standard Ethernet, Fast Ethernet (100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet.	1	08-09-2025		TLM2	
35.	**TUTORIAL-3**	1	09-09-2025		**TLM3**	
36.	**Quiz-3 ASSIGNMENT-3**	1	11-09-2025		**TLM6**	
No.of classes required to complete UNIT-III		12				

UNIT-IV:The Network Layer Design Issues

S.No.	Topics to be covered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Store and Forward Packet Switching-Services Provided to the Transport layer	1	13-09-2025		TLM2, TLM1	
38.	Implementation of Connectionless Service	1	15-09-2025		TLM2	
39.	Implementation of Connection Oriented Service	1	16-09-2025		TLM2, TLM1	
40.	Comparison of Virtual Circuit and Datagram Networks	1	18-09-2025		TLM2	
41.	Routing Algorithms-The Optimality principle	1	20-09-2025		TLM2, TLM4	
42.	Shortest path, Flooding	1	22-09-2025		TLM2	
43.	Distance vector, Link state	1	23-09-2025		TLM2, TLM4	
44.	Distance vector, Link state	1	25-09-2025		TLM2, TLM4	
45.	Hierarchical	1	25-09-2025		TLM2	
46.	Congestion Control algorithms-General principles of congestion control	1	04-10-2025		TLM2	
47.	Congestionpreventionpolice s	1	06-10-2025		TLM2	
48.	Traffic Control Algorithm-Leaky bucket & Token bucket.	1	07-10-2025		TLM2	
49.	**Internet Working:** Network layer in the internet	1	09-10-2025		TLM2	
50.	IP protocols-IP Version 4 protocol-IPV4Header Format	1	11-10-2025		TLM2, TLM4	
51.	IPaddresses	1	11-10-2025		TLM2, TLM1	
52.	ClassfullAddressing,CIDR	1	13-10-2025		TLM2, TLM4	
53.	Subnets-IPVersion6- The main IPV6 header	1	13-10-2025		TLM2, TLM1	

54.	Transition from IPV4 to IPV6	1	14-10-2025		TLM2	
55.	Comparison of IPV4 & IPV6	1	14-10-2025		TLM2,	
56.	**TUTORIAL4, Quiz-4 ASSIGNMENT-4**	1	16-10-2025		**TLM3, TLM6**	
No.ofclassesrequiredtocomplete UNIT-IV		20				

UNIT-V:The Transport Layer:

S.No.	Topicstobecovered	No.of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
58.	Transport layer protocols: Introduction-services, portnumber	1	18-10-2025		TLM2	
59.	User data gram protocol-User datagram-UDP Services	1	20-10-2025		TLM2, TLM1	
60.	Transmission control protocol: TCP services	1	23-10-2025		TLM2	
61.	TCP features- Segment-A TCP connection	1	25-10-2025		T TLM2, TLM1	
62.	**Application Layer** – World Wide Web: HTTP, Electronic mail-Architecture	1	27-10-2025		TLM2, TLM1	
63.	web based mail- email security, TELENET-local versus remote Logging	1	28-10-2025		TLM2	
64.	Domain Name System.	1	30-10-2025		TLM2	
65.	.**TUTORIAL-5, Quiz-5 ASSIGNMENT-5**	1	01-11-2025		**TLM3, TLM6**	
No.ofclassesrequiredtocomplete UNIT-V		08				

Contents beyond the Syllabus

S.No.	Topics to becovered	No. of Classes Required	Tentative Date of Completion	ActualDate of Completion	Teaching Learning Methods	HOD Sign
71.	DDNS,N/WLayer Design Issues	1	01-11-2025		TLM2	

TeachingLearningMethods			
TLM1	ChalkandTalk	**TLM4**	Demonstration(Lab/FieldVisit)
TLM2	PPT	**TLM5**	ICT(NPTEL/SwayamPrabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Part– C

EVALUATIONPROCESS:

EvaluationTask	Marks
Assignment-I(Units-I,II&UNIT-III(HalfoftheSyllabus))	A1=5
I-DescriptiveExamination(Units-I,II&UNIT-III(HalfoftheSyllabus))	M1=15
I-QuizExamination(Units-I,II&UNIT-III(HalfoftheSyllabus))	Q1=10
Assignment-II(Unit-III(RemainingHalfoftheSyllabus), IV&V)	A2=5
II-DescriptiveExamination(UNIT-III(RemainingHalfoftheSyllabus), IV&V)	M2=15
II-QuizExamination(UNIT-III(RemainingHalfoftheSyllabus),IV&V)	Q2=10
MidMarks=80%ofMax((M1+Q1+A1),(M2+Q2+A2))+20%ofMin((M1+Q1+A1),(M2+Q2+A	M=30
CumulativeInternalExamination(CIE):M	30
SemesterEndExamination(SEE)	70
TotalMarks=CIE+SEE	100

ACADEMICCALENDAR:

Description	From	To	Weeks
Commencement ofClass Work	30-06-2025		
IPhaseof Instructions	30-06-2025	23-08-2025	8W
IMidExaminations	25-08-2025	30-08-2025	1W
IIPhaseofInstructions	01-09-2025	01-11-2025	9W
IIMidExaminations	03-11-2025	08-11-2025	1W
PreparationandPractical's	10-11-2025	15-11-2025	1W
SemesterEndExaminations	17-11-2025	29-11-2025	2W

PART-D

PROGRAMMEEDUCATIONALOBJECTIVES(PEOs):

PEO1	Pursuea successfulcareerinthearea ofInformationTechnologyoritsalliedfields.
PEO2	ExhibitsoundknowledgeinthefundamentalsofInformationTechnologyandapply Practicalexperiencewithprogrammingtechniquestosolverealworldproblems.
PEO3	Abletodemonstrateself-learning,life-longlearningandworkinteamsonmultidisciplinary Projects.
PEO4	Abletounderstandtheprofessionalcodeofethicsanddemonstrateethicalbehavior, effective communication and team work and leadership skills in their job.

PROGRAMMEOUTCOMES(POs):

PO1	**Engineeringknowledge**:Applytheknowledgeofmathematics,science,engineering Fundamentals,andanengineeringspecializationtothesolutionofcomplexengineering problems.
PO2	**Problemanalysis**:Identify,formulate,reviewresearchliterature,andanalyzecomplex Engineeringproblemsreachingsubstantiatedconclusionsusingfirstprinciplesof 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 considerationforthepublichealthandsafety,andthecultural,societal,andenvironmental Considerations.
PO4	**Conductinvestigationsofcomplexproblems**:Useresearch-basedknowledgeandresearch 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 engineeringandITtoolsincludingpredictionandmodelingtocomplexengineering Activitieswithanunderstandingofthelimitations.
PO6	**Theengineerandsociety**:Applyreasoninginformedbythecontextualknowledgetoassess Societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environmentandsustainability**:Understandtheimpactoftheprofessionalengineering Solutionsocietalandenvironmentalcontexts,anddemonstratetheknowledgeof,and need for sustainable development.
PO8	**Ethics**:Applyethicalprinciplesandcommittoprofessionalethicsandresponsibilitiesand Normsoftheengineeringpractice.
PO9	**Individualandteamwork**:Functioneffectivelyasanindividual,andasamemberorleader indiverseteams, andinmultidisciplinarysettings.

PO10 **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and writeeffectivereportsanddesigndocumentation,makeeffectivepresentations,andgive and Receiveclearinstructions.

PO11 **Projectmanagementandfinance**:Demonstrateknowledgeandunderstandingofthe engineeringandmanagementprinciplesandapplythesetoone'sownwork,asamember Andleader ina team, tomanageprojectsandinmultidisciplinary environments.

PO12 **Life-longlearning**:Recognizetheneedfor,andhavethepreparationandabilitytoengagein Independentandlife-longlearninginthebroadestcontextoftechnologicalchange.

PROGRAMMESPECIFICOUTCOMES(PSOs)

PSO1 Organize,AnalyzeandInterpretthedata toextractmeaningfulconclusions.

PSO2 Design,ImplementandEvaluatea computer-basedsystemtomeetdesired needs.

PSO3 DevelopITapplicationserviceswiththehelpofdifferentcurrentengineeringtools.

	CourseInstructor	**CourseCoordinator**	**ModuleCoordinator**	**HOD**
Signature				
Nameofthe Faculty	**Mr.B.Ravindra chanti babu**	**Dr.B. Siva Rama Krishna**	**Mr.G.Rajendra**	**Dr.D. Ratna Kishore**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

Part-A

PROGRAM	:	**B.Tech.(IT), V-Semester Sec-B**
ACADEMIC YEAR	:	**2025-2026**
COURSE CODE&NAME	:	**23CS07 - COMPUTER NETWORKS**
L-T-P STRUCTURE	:	**3 0 0**
COURSE CREDITS	:	**3**
COURSE INSTRUCTOR	:	**Rajasekhar Kommaraju**
PRE-REQUISITES	:	Communication systems.

COURSE EDUCATIONAL OBJECTIVES (CEOs):

In this course student will learn:

COURSE OUTCOMES (COs):

The Objective of the course is to provide a foundation to understand computer networks using layered architectures. It also helps the students to understand the various network models, addressing concepts, routing protocols and design aspects of computer networks.

On successful completion of the course, students will be able to:

CO 1	Understand various network types, topologies, reference models, and transmission media. (**(Understand-L2)**
CO 2	Examine data link layer design issues, framing techniques, error control, and flow control mechanisms. **(Analyze-L4)**
CO 3	Apply multiple media access control techniques and evaluate Ethernet standards for network communication. **(Apply-L3)**
CO 4	Implement routing algorithms, congestion control techniques, and IP addressing schemes for efficient network communication. **(Apply-L3)**
CO 5	Utilize transport layer protocols (UDP & TCP) and application layer services (HTTP, DNS, and Email) to enable secure and reliable data communication. **(Apply-L3)**

Course Articulation Matrix (Correlation between COs& POs, PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2										1	2		
CO2	3	3		2								1	3		
CO3	2	2	3	2									3	2	
CO4	3	3	3	3								1	3	3	
CO5	3	3	2	2								1	3	3	

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**

1- Slight (Low), **2** –Moderate (Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 Behrouz A. Forouzan, "Data Communication and Networking", McGraw-Hill, 4th Edition, 2011.

T2 Andrew S. Tanenbaum, "Computer Networks", Pearson New International Edition, 8th Edition, 2013.

BOS APPROVED REFERENCE BOOKS:

R1 William Stallings, "Data and Computer Communication", Pearson Prentice Hall India, 8 th Edition.

R2 Douglas Comer, Internetworking with TCP/IP, Prentice Hall of India, Volume 1, 6th Edition, 2009.

R3 Richard Stevens, "TCP/IP Illustrated" , Addison-Wesley, Volume 1, 2001.

R4 http://www.cse.iitk.ac.in/users/dheeraj/cs425/.

R5 http://www.tcpipguide.com/free/t_OSIReferenceModelLayers.htm

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: Introduction & Physical Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Discussion of Cos and CEOs of the course	1	30-06-2025		TLM1,TLM2	
2.	Introduction to Data Communication and Computer Networks	1	01-07-2025		TLM1	
3.	Network Types, LAN, MAN, WAN	1	03-07-2025		TLM2	
4.	Various Network Connection Topology s	1	05-07-2025		TLM1,TLM2	
5.	OSI model	3	07-07-2025 , 08-07-2025 & 10-07-2025		TLM1,TLM2	
6	TCP/IP Reference Model	1	14-07-2025		TLM2	
7	Comparison of the OSI and TCP/IP Reference Models	1	15-07-2025		TLM2	
8.	Introduction to Guided Media Twisted-pair cable	1	17-07-2025		TLM1,TLM2	
9.	Coaxial cable, and Fiber optic cable	1	19-07-2025		TLM2	
10.	Introduction about unguided media.	1	21-07-2025		TLM2	
11	**TUTORIAL-1**	1	22-07-2025		**TLM3**	
12.	**Assignment or Quiz**	1	24-07-2025		**TLM6**	
No. of classes required to complete UNIT-I		14				

UNIT-II: Data Link Layer

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	Introduction to DLL, Data link layer design issues	1	26-07-2025		TLM2	
14.	**Framing**: fixed size framing, variable size framing, flow control	1	28-07-2025		TLM2	
15.	Error control, error detection and correction codes	1	29-07-2025		TLM2, TLM4	

16.	CRC	1	31-07-2025		TLM2 , TLM4	
17.	Checksum: idea, one's complement internet checksum	1	02-08-2025		TLM2, TLM4	
18.	Services provided to Network Layer	1	04-08-2025		TLM2	
19.	**Elementary Data Link Layer protocols**: simplex protocol	1	05-08-2025		TLM2	
20.	Simplex stop and wait, Simplex protocol for Noisy Channel	1	07-08-2025		TLM2	
21.	**Sliding window protocol:** One bit, Go back N	1	09-08-2025		TLM2, TLM4	
22	Selective repeat-Stop and wait protocol	1	11-08-2025		TLM2, TLM4	
23.	**TUTORIAL-2**	1	12-08-2025		**TLM3**	
24	**Quiz-2 ASSIGNMENT-2**	1	14-08-2025		**TLM6**	
No. of classes required to complete UNIT-II		12				

UNIT-III: Media Access Control: Random Access

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	ALOHA	1	16-08-2025		TLM2	
26.	Carrier sense multiple access (CSMA), CSMA with Collision Detection	1	18-08-2025		TLM2, TLM1	
27.	Carrier sense multiple access (CSMA), CSMA with Collision Detection	1	19-08-2025		TLM2, TLM1	
28.	CSMA with Collision Avoidance	1	21-08-2025		TLM2	
29.	**Channelization:** frequency division multiple Access(FDMA)	1	23-08-2025		TLM2	
30.	time division multiple access(TDMA)	1	01-09-2025		TLM2, TLM1	
31.	code division multiple access(CDMA)	1	02-09-2025		TLM2	
32	**Wired LANs:** Ethernet, Ethernet Protocol	1	04-09-2025		TLM2, TLM1	
33	Standard Ethernet, Fast Ethernet(100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet.	1	06-09-2025		TLM2, TLM1	

34.	Standard Ethernet, Fast Ethernet(100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet.	1	08-09-2025		TLM2	
35.	**TUTORIAL-3**	1	09-09-2025		**TLM3**	
36.	**Quiz-3** **ASSIGNMENT-3**	1	11-09-2025		**TLM6**	
No. of classes required to complete UNIT-III		12				

UNIT-IV: The Network Layer Design Issues

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
37.	Store and Forward Packet Switching-Services Provided to the Transport layer	1	13-09-2025		TLM2, TLM1	
38.	Implementation of Connectionless Service	1	15-09-2025		TLM2	
39.	Implementation of Connection Oriented Service	1	16-09-2025		TLM2, TLM1	
40.	Comparison of Virtual Circuit and Datagram Networks	1	18-09-2025		TLM2	
41.	Routing Algorithms-The Optimality principle	1	20-09-2025		TLM2, TLM4	
42.	Shortest path, Flooding	1	22-09-2025		TLM2	
43.	Distance vector, Link state	1	23-09-2025		TLM2, TLM4	
44.	Distance vector, Link state	1	25-09-2025		TLM2, TLM4	
45.	Hierarchical	1	25-09-2025		TLM2	
46.	Congestion Control algorithms-General principles of congestion control	1	04-10-2025		TLM2	
47.	Congestion prevention polices	1	06-10-2025		TLM2	
48.	Traffic Control Algorithm-Leaky bucket & Token bucket.	1	07-10-2025		TLM2	
49.	**Internet Working:** Network layer in the internet	1	09-10-2025		TLM2	
50.	IP protocols-IP Version 4 protocol-IPV4 Header Format	1	11-10-2025		TLM2, TLM4	
51.	IP addresses	1	11-10-2025		TLM2, TLM1	
52.	Class full Addressing, CIDR	1	13-10-2025		TLM2, TLM4	
53.	Subnets-IP Version 6- The	1	13-10-2025		TLM2, TLM1	

	main IPV6 header					
54.	Transition from IPV4 to IPV6	1	14-10-2025		TLM2	
55.	Comparison of IPV4 & IPV6	1	14-10-2025		TLM2,	
56.	**TUTORIAL4, Quiz-4 ASSIGNMENT-4**	1	16-10-2025		**TLM3, TLM6**	
No. of classes required to complete UNIT-IV		20				

UNIT-V: The Transport Layer:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
58.	Transport layer protocols: Introduction-services, port number	1	18-10-2025		TLM2	
59.	User data gram protocol-User datagram-UDP Services	1	20-10-2025		TLM2, TLM1	
60.	Transmission control protocol: TCP services	1	23-10-2025		TLM2	
61.	TCP features-Segment- A TCP connection	1	25-10-2025		T TLM2, TLM1	
62.	**Application Layer** – World Wide Web: HTTP, Electronic mail-Architecture	1	27-10-2025		TLM2, TLM1	
63.	web based mail- email security, TELENET-local versus remote Logging	1	28-10-2025		TLM2	
64.	Domain Name System.	1	30-10-2025		TLM2	
65.	. **TUTORIAL-5, Quiz-5 ASSIGNMENT-5**	1	01-11-2025		**TLM3, TLM6**	
No. of classes required to complete UNIT-V		08				

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign
71.	DDNS, N/W Layer Design Issues	1	01-11-2025		TLM2	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Part – C

EVALUATION PROCESS:

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	30-06-2025		
I Phase of Instructions	30-06-2025	23-08-2025	8W
I Mid Examinations	25-08-2025	30-08-2025	1W
II Phase of Instructions	01-09-2025	01-11-2025	9W
II Mid Examinations	03-11-2025	08-11-2025	1W
Preparation and Practical's	10-11-2025	15-11-2025	1W
Semester End Examinations	17-11-2025	29-11-2025	2W

PART-D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	Pursue a successful career in the area of Information Technology or its allied fields.
PEO 2	Exhibit sound knowledge in the fundamentals of Information Technology and apply Practical experience with programming techniques to solve real world problems.
PEO 3	Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary Projects.
PEO 4	Able to understand the professional code of ethics and demonstrate ethical behavior, effective communication and team work and leadership skills in their job.

PROGRAMME 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 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 Solution 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.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1 Organize, Analyze and Interpret the data to extract meaningful conclusions.

PSO2 Design, Implement and Evaluate a computer-based system to meet desired needs.

PSO3 Develop IT application services with the help of different current engineering tools.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**
Signature				
Name of the Faculty	**Mr. K. Rajasekhar**	**Dr.B. Siva Rama Krishna**	**Mr. G.Rajendra**	**Dr. D. Ratna Kishore**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.
http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931
DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: M. VIJAY KUMAR
Course Name & Code : Automata Theory & Compiler Design, **23CS12**
L-T-P Structure : **3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-IT / V SEM/A-Sec
A.Y. : 2025-26

PRE-REQUISITE: Discrete Mathematics, Programming Basics, Data Structures, Algorithms

1. Understand fundamental concepts of automata, formal languages, and computation.
2. Design finite automata, pushdown automata, and Turing machines.
3. Apply regular expressions and grammars for language processing.
4. Learn the structure and functioning of a compiler.
5. Implement lexical analysis, parsing, and intermediate code generation.

CO1	Understand and apply concepts of formal languages, alphabets, strings, and finite automata for modelling simple computational problems. **(Understand-L2)**
CO2	Construct and analyze regular expressions and context-free grammars for language definition and pattern matching. **(Analyze-L4)**
CO3	Design pushdown automata and Turing machines and evaluate problems of decidability and language classification. **(Create-L6)**
CO4	Explain the phases of compilation and implement lexical and syntax analysis techniques using tools and algorithms. **(Understand-L2)**
CO5	Apply syntax-directed translation and generate intermediate code with memory management for a target machine. **(Apply-L3)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

CO	Program Outcomes (POs)												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	2	2								3	2	3
CO2	3	3	3	2	2								3	3	
CO3	3	3	3	3	2								3	3	
CO4	3	3	3	2	3					2			3	3	2
CO5	3	3	3	2	3					2			3	3	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**

1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

TEXTBOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, 2nd Edition, Pearson.
3. Theory of Computer Science – Automata languages and computation, Mishra and Chandra shekaran, 2nd Edition, PHI.

REFERENCE BOOKS:

1. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan, Rama R, Pearson.
2. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
3. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
4. Compiler Construction, Kenneth C. Louden, Thomson. Course Technology.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Finite Automata

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1	Structural Representations, Automata and Complexity	1	01-07-2025		**TLM1**	CO1	
2	Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems	3	02-07-2025 03-07-2025 04-07-2025		**TLM1** **TLM2** **TLM2**	CO1	
3	Formal Definition, an application	1	08-07-2025		**TLM1**	CO1	
4	Deterministic Finite Automata (DFA),	1	09-07-2025		**TLM1**	CO1	
5	How A DFA Process Strings	1	10-07-2025		**TLM2**	CO1	
6	The language of DFA	1	11-07-2025		**TLM1**	CO1	
7	Nondeterministic Finite Automata	1	15-07-2025		**TLM1**	CO1	
8	Nondeterministic Finite Automata problems	2	16-07-2025 17-07-2025		**TLM3** **TLM1**	CO1	
9	Finite Automata with Epsilon-Transitions	2	18-07-2025 22-07-2025		**TLM1** **TLM1**	CO1	

10	Conversion of NFA to DFA	2	23-07-2025 24-07-2025		**TLM1** **TLM2**	CO1	
11	Conversion of NFA with €-transitions to NFA without €-transitions	2	25-07-2025 29-07-2025		**TLM1** **TLM3**	CO1	
No. of classes required to complete UNIT-I		17	No. of classes taken:				

UNIT-II: Regular Expression

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
12	Finite Automata and Regular Expressions	1	30-07-2025		**TLM1**	CO2	
13	Applications of Regular Expressions	1	31-07-2025		**TLM1**	CO2	
14	Algebraic Laws for Regular Expressions	1	01-08-2025		**TLM1**	CO2	
15	Conversion of Finite Automata to Regular Expressions	2	05-08-2025 06-08-2025		**TLM1** **TLM2**	CO2	
16	Pumping Lemma for Regular Languages	1	07-08-2025		**TLM2**	CO2	
17	Statement of the pumping lemma, Applications of the Pumping Lemma	1	08-08-2025		**TLM6**	CO2	
18	Context free languages: context free grammars(CFG),	1	12-08-2025		**TLM1**	CO2	
19	Derivations Using a Grammar	2	13-08-2025 14-08-2025		**TLM1** **TLM2**	CO2	
20	the Language of a Grammar	1	19-08-2025		**TLM1**	CO2	
21	Parse Trees	1	20-08-2025		**TLM2**	CO2	
22	Ambiguity in Grammars and Languages	1	21-08-2025		**TLM1**	CO2	
No. of classes required to complete UNIT-2		13	No. of classes taken:				

UNIT – III: Pushdown Automata

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
23	Definition of the Pushdown Automaton	1	22-08-2025		**TLM2**	CO3	

24	the Languages of a PDA Grammar	1	02-09-2025		**TLM1**	CO3	
25	Equivalence of PDA's and CFG's	2	03-09-2025 04-09-2025		**TLM1** **TLM3**	CO3	
26	Acceptance by final state Turing Machines	1	09-09-2025		**TLM1**	CO3	
27	Introduction to Turing Machine, Formal Description, Instantaneous description	1	10-09-2025		**TLM2**	CO3	
28	The language of a Turing machine Undecidability:	1	11-09-2025		**TLM1**	CO3	
29	Undecidability, A Language that is Not Recursively Enumerable,	1	12-09-2025		**TLM1**	CO3	
30	An Undecidable Problem That is RE	1	16-09-2025		**TLM1**	CO3	
31	Undecidable Problems about Turing Machines	1	17-09-2025		**TLM1**	CO3	
No. of classes required to complete UNIT-3		10	No. of classes taken:				

UNIT-IV Introduction:

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
32	The structure of a compiler	1	18-09-2025		**TLM1**	CO4	
33	Lexical Analysis: The Role of the Lexical Analyzer,Input Buffering,	1	19-09-2025		**TLM1**	CO4	
34	Recognition of Tokens,	1	23-09-2025		**TLM1**	CO4	
35	The Lexical- Analyzer Generator Lex,	1	24-09-2025		**TLM1**	CO4	
36	Syntax Analysis: Introduction, Context-Free Grammars	1	25-09-2025		**TLM1**	CO4	
37	Writing a Grammar, Top-Down Parsing,	2	26-09-2025 03-10-2025		**TLM1** **TLM6**	CO4	
38	Bottom- Up Parsing, Introduction to LR Parsing	2	07-10-2025 08-10-2025		**TLM1** **TLM1**	CO4	
39	Simple LR	1	09-10-2024		**TLM1**	CO4	
40	More Powerful LR Parsers	1	10-10-2024		**TLM1**	CO4	
No. of classes required to complete UNIT-4		12	No. of classes taken:				

UNIT-V: Syntax-Directed Translation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
41	Syntax-Directed Definitions, Evaluation Orders for SDD'	1	14-10-2025		**TLM1**	CO5	
42	Syntax Directed Translation Schemes	1	15-10-2025		**TLM6**	CO5	
43	Implementing L-Attributed SDD's.	1	16-10-2025		**TLM1**	CO5	
44	Intermediate-Code Generation: Variants of Syntax Trees	1	17-10-2025		**TLM1**	CO5	
45	Three-Address Code Run-Time Environments:	1	21-10-2025		**TLM1**	CO5	
46	Stack Allocation of Space	1	22-10-2025		**TLM1**	CO5	
47	Access to Nonlocal Data on the Stack,.	1	23-10-2025		**TLM1**	CO5	
48	Heap Management	1	24-10-2025		**TLM2**	CO5	
No. of classes required to complete UNIT-5		8	No. of classes taken:				

TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/SWAYAM/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

EVALUATION PROCESS:

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30

Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**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.
PO 6	**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.
PO 7	**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
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing 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
PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr. M Vijay kumar		Mr. G Rajendra	Dr. D. Ratna Kishore
Signature				

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COURSE HANDOUT

PART-A

Name of Course Instructor **M. VIJAY KUMAR**
Course Name & Code **:** Automata Theory & Compiler Design, **23CS12**
L-T-P Structure **: 3-0-0** **Credits:** 03
Program/Sem/Sec : B.Tech-IT / V SEM/B-Sec
A.Y. **:** 2025-26

PRE-REQUISITE: Discrete Mathematics, Programming Basics, Data Structures, Algorithms

1. Understand fundamental concepts of automata, formal languages, and computation.
2. Design finite automata, pushdown automata, and Turing machines.
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4. Learn the structure and functioning of a compiler.
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CO1	Understand and apply concepts of formal languages, alphabets, strings, and finite automata for modelling simple computational problems. **(Understand-L2)**
CO2	Construct and analyze regular expressions and context-free grammars for language definition and pattern matching. **(Analyze-L4)**
CO3	Design pushdown automata and Turing machines and evaluate problems of decidability and language classification. **(Create-L6)**
CO4	Explain the phases of compilation and implement lexical and syntax analysis techniques using tools and algorithms. **(Understand-L2)**
CO5	Apply syntax-directed translation and generate intermediate code with memory management for a target machine. **(Apply-L3)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

CO	Program Outcomes (POs)												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	2	2								3	2	3
CO2	3	3	3	2	2								3	3	
CO3	3	3	3	3	2								3	3	
CO4	3	3	3	2	3					2			3	3	2
CO5	3	3	3	2	3					2			3	3	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**

1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

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2. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, 2nd Edition, Pearson.
3. Theory of Computer Science – Automata languages and computation, Mishra and Chandra shekaran, 2nd Edition, PHI.

REFERENCE BOOKS:

1. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan, Rama R, Pearson.
2. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
3. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
4. Compiler Construction, Kenneth C. Louden, Thomson. Course Technology.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Finite Automata

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
1	Structural Representations, Automata and Complexity	1	30-06-2025		**TLM1**	CO1	
2	Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems	3	03-07-2025 04-07-2025 05-07-2025		**TLM1** **TLM2** **TLM2**	CO1	
3	Formal Definition, an application	1	07-07-2025		**TLM1**	CO1	
4	Deterministic Finite Automata (DFA),	1	10-07-2025		**TLM1**	CO1	
5	How A DFA Process Strings	1	11-07-2025		**TLM2**	CO1	
6	The language of DFA	1	14-07-2025		**TLM1**	CO1	
7	Nondeterministic Finite Automata	1	17-07-2025		**TLM1**	CO1	
8	Nondeterministic Finite Automata problems	2	18-07-2025 19-07-2025		**TLM3** **TLM1**	CO1	
9	Finite Automata with Epsilon-Transitions	2	21-07-2025 24-07-2025		**TLM1** **TLM1**	CO1	

10	Conversion of NFA to DFA	2	25-07-2025 26-07-2025		**TLM1** **TLM2**	CO1	
11	Conversion of NFA with €-transitions to NFA without €-transitions	2	28-07-2025 31-07-2025		**TLM1** **TLM3**	CO1	
No. of classes required to complete UNIT-I		17	No. of classes taken:				

UNIT-II: Regular Expression

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
12	Finite Automata and Regular Expressions	1	01-08-2025		**TLM1**	CO2	
13	Applications of Regular Expressions	1	02-08-2025		**TLM1**	CO2	
14	Algebraic Laws for Regular Expressions	1	01-08-2025		**TLM1**	CO2	
15	Conversion of Finite Automata to Regular Expressions	2	04-08-2025 07-08-2025		**TLM1** **TLM2**	CO2	
16	Pumping Lemma for Regular Languages	1	08-08-2025		**TLM2**	CO2	
17	Statement of the pumping lemma, Applications of the Pumping Lemma	1	11-08-2025		**TLM6**	CO2	
18	Context free languages: context free grammars(CFG),	1	14-08-2025		**TLM1**	CO2	
19	Derivations Using a Grammar	2	18-08-2025 21-08-2025		**TLM1** **TLM2**	CO2	
20	the Language of a Grammar	1	22-08-2025		**TLM1**	CO2	
21	Parse Trees	1	23-08-2025		**TLM2**	CO2	
22	Ambiguity in Grammars and Languages	1	01-09-2025		**TLM1**	CO2	
No. of classes required to complete UNIT-2		13	No. of classes taken:				

UNIT – III: Pushdown Automata

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
23	Definition of the Pushdown Automaton	1	04-09-2025		**TLM2**	CO3	

24	the Languages of a PDA Grammar	1	06-09-2025		**TLM1**	CO3	
25	Equivalence of PDA's and CFG's	2	08-09-2025 11-09-2025		**TLM1** **TLM3**	CO3	
26	Acceptance by final state Turing Machines	1	12-09-2025		**TLM1**	CO3	
27	Introduction to Turing Machine, Formal Description, Instantaneous description	1	15-09-2025		**TLM2**	CO3	
28	The language of a Turing machine Undecidability:	1	18-09-2025		**TLM1**	CO3	
29	Undecidability, A Language that is Not Recursively Enumerable,	1	19-09-2025		**TLM1**	CO3	
30	An Undecidable Problem That is RE	1	20-09-2025		**TLM1**	CO3	
31	Undecidable Problems about Turing Machines	1	22-09-2025		**TLM1**	CO3	
No. of classes required to complete UNIT-3		10	No. of classes taken:				

UNIT-IV Introduction:

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
32	The structure of a compiler	1	25-09-2025		**TLM1**	CO4	
33	Lexical Analysis: The Role of the Lexical Analyzer,Input Buffering,	1	26-09-2025		**TLM1**	CO4	
34	Recognition of Tokens,	1	27-09-2025		**TLM1**	CO4	
35	The Lexical- Analyzer Generator Lex,	1	03-10-2025		**TLM1**	CO4	
36	Syntax Analysis: Introduction, Context-Free Grammars	1	04-10-2025		**TLM1**	CO4	
37	Writing a Grammar, Top-Down Parsing,	2	06-10-2025 09-10-2025		**TLM1** **TLM6**	CO4	
38	Bottom- Up Parsing, Introduction to LR Parsing	2	10-10-2025 11-10-2025		**TLM1** **TLM1**	CO4	
39	Simple LR	1	13-10-2024		**TLM1**	CO4	
40	More Powerful LR Parsers	1	16-10-2024		**TLM1**	CO4	
No. of classes required to complete UNIT-4		12	No. of classes taken:				

UNIT-V: Syntax-Directed Translation

S.No	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcomes	HOD Sign Weekly
41	Syntax-Directed Definitions, Evaluation Orders for SDD'	1	17-10-2025		**TLM1**	CO5	
42	Syntax Directed Translation Schemes	1	18-10-2025		**TLM6**	CO5	
43	Implementing L-Attributed SDD's.	1	23-10-2025		**TLM1**	CO5	
44	Intermediate-Code Generation: Variants of Syntax Trees	1	24-10-2025		**TLM1**	CO5	
45	Three-Address Code Run-Time Environments:	1	25-10-2025		**TLM1**	CO5	
46	Stack Allocation of Space	1	27-10-2025		**TLM1**	CO5	
47	Access to Nonlocal Data on the Stack,.	1	30-10-2025		**TLM1**	CO5	
48	Heap Management	1	31-10-2025		**TLM2**	CO5	
No. of classes required to complete UNIT-5		8	No. of classes taken:				

TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/SWAYAM/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

EVALUATION PROCESS:

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30

Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**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.
PO 6	**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.
PO 7	**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
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineer**ing 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
PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr. M Vijaykumar		Mr. G Rajendra	Dr. D. Ratna Kishore
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I),
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230.

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: J.GeethaRenuka
Course Name & Code : **23AD02-ARTIFICIAL INTELLIGENCE**
L-T-P Structure :3-0-0 Credits: 3
Program/Sem/Sec :BTECH/V/A **A.Y.:** 2025-26

PREREQUISITE: Basic Engineering and Mathematics knowledge

COURSE EDUCATIONAL OBJECTIVES (CEOs):

1. The student should be made to study the concepts of Artificial Intelligence.
2. The student should be made to learn the methods of solving problems using Artificial Intelligence.
3. The student should be made to introduce the concepts of Expert Systems.
4. To understand the applications of AI, namely game playing, theorem proving, and machine learning.
5. To learn different knowledge representation techniques.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Enumerate the history & Foundation of AI (Understand-L2)
CO2	Apply the Searching algorithms for AI in problem solving (Apply-L3)
CO3	Choose the appropriate representation of knowledge (Apply-L3)
CO4	Choose the appropriate logic concepts (Apply-L3)
CO5	Understand the Expert systems techniques in AI (Understand-L2)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-	-	1	2	3	-
CO3	3	3	-	2	-	-	-	-	-	-	-	-	2	3	-
CO4	3	3	-	2	-	-	-	-	-	-	-	1	2	3	-
CO5	3	2	-	-	-	-	-	-	-	-	-	2	1	1	-

1 - Low **2 –**Medium **3 -** High

TEXTBOOKS:

T1	S. Russel and P. Norvig "Artificial Intelligence–A Modern Approach", Second Edition, Pearson Education.
T2	Kevin Night and Elaine Rich, Nair B. "Artificial Intelligence (SIE)", Mc Graw Hill

REFERENCE BOOKS:

R1	David Poole, Alan Mack worth, Randy Goebel, "Computational Intelligence: a logical approach", Oxford University Press.
R2	G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education.
R3	J.Nilsson,"ArtificialIntelligence:AnewSynthesis",ElsevierPublishers.
R4	Artificial Intelligence, Saroj Kaushik, CENGAGE Learning.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	**Introduction:** AI problems	1	01/07/2025		TLM1,2	
2.	Foundation of AI and history of AI	1	03/07/2025		TLM1,2	
3.	Intelligent Agents	1	04/07/2025		TLM1,2	
4.	Types of Agents	2	05/07/2025 08/07/2025		TLM1,2	
5.	Environments	1	10/07/2025		TLM1,2	
6.	Concept of rationality	1	11/07/2025		TLM1,2	
7.	Nature of environments	1	12/07/2025		TLM1,2	
8.	Structure of agents	1	15/07/2025		TLM1,2	
9.	Problem solving agents	1	17/07/2025		TLM1,2	
10.	Problem formulation	1	18/07/2025		TLM1,2	
11.	AI's Impact on Jobs and Economy (Group Discussion)	1	19/07/2025		TLM6	
No. of classes required to complete UNIT-I: 11				**No. of classes taken:**		

UNIT-II: Searching

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Searching for solutions	1	22/07/2025		TLM1,2	
13.	uniformed search strategies	1	24/07/2025		TLM1,2	
14.	Breadth first search, depth first Search.	1	25/07/2025		TLM1,2	
15.	Search with partial information(Heuristic search)	1	26/07/2025		TLM1,2	
16.	Hill climbing	1	29/07/2025		TLM1,2	
17.	A* Algorithm	1	31/07/2025		TLM1,2	
18.	AO* Algorithm, Problem reduction	1	01/08/2025		TLM1,2	
19.	Game Playing-Adversial search	1	02/08/2025		TLM1,2	
20.	Games, mini-max algorithm	1	05/08/2025		TLM1,2	
21.	optimal decisions in multiplayer games, Problem in Game playing	1	07/08/2025		TLM1,2	
22.	Alpha-Beta pruning, Evaluation functions	1	08/08/2025		TLM1,2	
23.	Types of Deep Neural Networks	1	09/08/2025		TLM1,2	
24.	Tutorial	1	12/08/2025		TLM 3	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: Representation of Knowledge

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	Knowledge Representation and issues	1	14/08/2025		TLM1,2	
26.	Predicate logic- logic programming	2	19/08/2025 21/08/2025		TLM1,2	
27.	Semantic nets- frames and inheritance,	2	22/08/2025 02/09/2025		TLM1,2	
28.	Constraint propagation	1	04/09/2025		TLM1,2	
29.	Representing knowledge using Rules	1	06/09/2025		TLM1,2	
30.	Rules based deduction systems	1	09/09/2025		TLM1,2	
31.	Reasoning under uncertainty and review of probability	1	11/09/2025		TLM1,2	
32.	Bayes' probabilistic interferences	1	12/09/2025		TLM1,2	
33.	Dempster shafer theory	1	13/09/2025		TLM1,2	
34.	Tutorial	1	16/09/2025		TLM3	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: Logic Concepts

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	First order logic. Inference in first order logic	1	19/09/2025		TLM1,2	
35.	Propositional vs. first order	1	20/09/2025		TLM1,2	
36.	Inference	1	23/09/2025		TLM1,2	
37.	Unification & lifts forward chaining	1	25/09/2025		TLM1,2	
38.	Backward chaining, Resolution	1	19/09/2025		TLM1,2	
39.	Learning from observation Inductive learning	1	27/09/2025		TLM1,2	
40.	Decision trees, Explanation based learning,	2	03/10/2025 04/10/2025		TLM1,2	
41.	Statistical Learning methods	2	07/10/2025 09/10/2025		TLM1,2	
42.	Reinforcement Learning.	1	10/10/2025		TLM1,2	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: Expert Systems

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43	Architecture of expert systems	2	11/10/2025 14/10/2025		TLM1,2	
44	Knowledge Acquisition Meta knowledge Heuristics.	2	16/10/2025 17/10/2025		TLM1,2	
45	Typical expert systems	1	18/10/2025		TLM1,2	
46	MYCIN	2	21/10/2025 23/10/2025		TLM1,2	
47	DART	2	24/10/2025 25/10/2025		TLM1,2	
48	XCON: Expert systems shells.	2	28/10/2025 30/10/2025		TLM1,2	
49	Tutorial	1	31/10/2025		TLM3	
No. of classes required to complete UNIT-V: 15				**No. of classes taken:**		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II	A1=5
I-Descriptive Examination (Units-I, II	M1=15
I-Quiz Examination (Units-I, II	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (UNIT-III, IV & V)	M2=15
II-Quiz Examination (UNIT-III ,IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**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.

PO 6	**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.
PO 7	**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.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**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.
PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	**Organize, Analyze and Interpret the data to extract meaningful conclusions.**
PSO 2	**Design, Implement and Evaluate a computer-based system to meet desired needs.**
PSO 3	**Develop IT application services with the help of different current engineering tools.**

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	J.Geetharenuka	Dr.N.V MahaLakshmi	Mr.G.Rajendra	Dr. D. Ratna Kishore
Signature				

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http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr.S.Naganjaneyulu
Course Name & Code : **23AD02-ARTIFICIAL INTELLIGENCE**
L-T-P Structure : 3-0-0 Credits: 3
Program/Sem/Sec : B.Tech/V Sem/B Sec **A.Y.:** 2025-26

PREREQUISITE: Basic Engineering and Mathematics knowledge

COURSE EDUCATIONAL OBJECTIVES (CEOs):

1. The student should be made to study the concepts of Artificial Intelligence.
2. The student should be made to learn the methods of solving problems using Artificial Intelligence.
3. The student should be made to introduce the concepts of Expert Systems.
4. To understand the applications of AI, namely game playing, theorem proving, and machine learning.
5. To learn different knowledge representation techniques.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Enumerate the history & Foundation of AI **(Understand-L2)**
CO2	Apply the Searching algorithms for AI in problem solving **(Apply-L3)**
CO3	Choose the appropriate representation of knowledge **(Apply-L3)**
CO4	Choose the appropriate logic concepts **(Apply-L3)**
CO5	Understand the Expert systems techniques in AI **(Understand-L2)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-	-	1	2	3	-
CO3	3	3	-	2	-	-	-	-	-	-	-	-	2	3	-
CO4	3	3	-	2	-	-	-	-	-	-	-	1	2	3	-
CO5	3	2	-	-	-	-	-	-	-	-	-	2	1	1	-

1 - Low **2 –**Medium **3 -** High

TEXTBOOKS:

T1	S. Russel and P. Norvig "Artificial Intelligence–A Modern Approach", Second Edition, Pearson Education.
T2	Kevin Night and Elaine Rich, Nair B. "Artificial Intelligence (SIE)", Mc Graw Hill

REFERENCE BOOKS:

R1	David Poole, Alan Mack worth, Randy Goebel, "Computational Intelligence: a logical approach", Oxford University Press.
R2	G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education.
R3	J.Nilsson,"ArtificialIntelligence:AnewSynthesis",ElsevierPublishers.
R4	Artificial Intelligence, Saroj Kaushik, CENGAGE Learning.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	**Introduction:** AI problems	1	30/06/2025		TLM1,2	
2.	Foundation of AI and history of AI	1	01/07/2025		TLM1,2	
3.	Intelligent Agents : Agents	1	02/07/2025		TLM1,2	
4.	Types of Agents	1	05/07/2025		TLM1,2	
5.	Environments, Concept of rationality	1	07/07/2025		TLM1,2	
6.	Nature of environments	1	08/07/2025		TLM1,2	
7.	Structure of agents	1	09/07/2025		TLM1,2	
8.	Problem solving agents	1	14/07/2025		TLM1,2	
9.	Problem formulation	1	15/07/2025		TLM1,2	
10.	AI's Impact on Jobs and Economy (Group Discussion)	1	16/07/2025		TLM6	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: Searching

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
12.	Searching for solutions	1	19/07/2025		TLM1,2	
13.	uniformed search strategies	1	21/07/2025		TLM1,2	
14.	Breadth first search, depth first Search.	1	22/07/2025		TLM1,2	
15.	Search with partial information(Heuristic search)	1	23/07/2025		TLM1,2	
16.	Hill climbing	1	26/07/2025		TLM1,2	
17.	A* Algorithm	1	28/07/2025		TLM1,2	
18.	AO* Algorithm, Problem reduction	1	29/07/2025		TLM1,2	
19.	Game Playing-Adversial search	1	30/07/2025		TLM1,2	
20.	Games, mini-max algorithm	1	04/08/2025		TLM1,2	
21.	optimal decisions in multiplayer games, Problem in Game playing	1	05/08/2025		TLM1,2	
22.	Alpha-Beta pruning, Evaluation functions	1	06/08/2025		TLM1,2	
23.	Types of Deep Neural Networks	1	11/08/2025		TLM1,2	
24.	Tutorial	1	12/08/2025		TLM 3	
No. of classes required to complete UNIT-II: 13				**No. of classes taken:**		

UNIT-III: Representation of Knowledge

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	Knowledge Representation and issues	1	13/08/2025		TLM1,2	
26.	Predicate logic- logic programming	2	18/08/2025 19/08/2025		TLM1,2	
27.	Semantic nets- frames and inheritance,	2	20/08/2025 23/08/2025		TLM1,2	
	Constraint propagation	1	01/09/2025		TLM1,2	
29.	Representing knowledge using Rules	1	02/09/2025		TLM1,2	
	Rules based deduction systems	1	03/09/2025		TLM1,2	
31.	Reasoning under uncertainty and review of probability	1	06/09/2025		TLM1,2	
32.	Bayes' probabilistic interferences	1	08/09/2025		TLM1,2	
33.	Dempster shafer theory	1	09/09/2025		TLM1,2	
34.	Tutorial	1	10/09/2025		TLM3	
No. of classes required to complete UNIT-III: 12				**No. of classes taken:**		

UNIT-IV: Logic Concepts

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
34.	First order logic. Inference in first order logic	1	15/09/2025		TLM1,2	
35.	Propositional vs. first order	1	16/09/2025		TLM1,2	
36.	Inference	1	17/09/2025		TLM1,2	
37.	Unification & lifts forward chaining	1	20/09/2025		TLM1,2	
38.	Backward chaining, Resolution	1	22/09/2025		TLM1,2	
39.	Learning from observation Inductive learning	1	23/09/2025		TLM1,2	
40.	Decision trees, Explanation based learning,	2	24/09/2025 27/09/2025		TLM1,2	
41.	Statistical Learning methods	2	04/10/2025 06/10/2025		TLM1,2	
42.	Reinforcement Learning.	1	07/10/2025		TLM1,2	
No. of classes required to complete UNIT-IV: 11				**No. of classes taken:**		

UNIT-V: Expert Systems

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43	Architecture of expert systems	2	08/10/2025 13/10/2025		TLM1,2	
44	Knowledge Acquisition Meta knowledge Heuristics.	2	14/10/2025 15/10/2025		TLM1,2	
45	Typical expert systems	1	18/10/2025		TLM1,2	
46	MYCIN	2	21/10/2025 22/10/2025		TLM1,2	
47	DART	2	25/10/2025 27/10/2025		TLM1,2	
48	XCON: Expert systems shells. Tutorial	2	28/10/2025 29/10/2025		TLM1,2,3	
No. of classes required to complete UNIT-V: 11				**No. of classes taken:**		

Contents beyond the Syllabus

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
43	Generative AI	1	01/11/2025		TLM1,2	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II	A1=5
I-Descriptive Examination (Units-I, II	M1=15
I-Quiz Examination (Units-I, II	Q1=10
Assignment-II (Unit-III, IV & V)	A2=5
II- Descriptive Examination (UNIT-III, IV & V)	M2=15
II-Quiz Examination (UNIT-III ,IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**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.

PO 6	**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.
PO 7	**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.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**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.
PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	**Organize, Analyze and Interpret the data to extract meaningful conclusions.**
PSO 2	**Design, Implement and Evaluate a computer-based system to meet desired needs.**
PSO 3	**Develop IT application services with the help of different current engineering tools.**

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Dr.S.Naganjaneyulu	Dr.N.V MahaLakshmi	Mr.G.Rajendra	Dr. D. Ratna Kishore
Signature				

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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART - A

PROGRAM	**: B.Tech. - V-Sem. - A Sec - Information Technology**
ACADEMIC YEAR	**:** 2025-26
COURSE NAME & CODE	**: INTRODUCTION TO INDUSTRIAL ROBOTICS – 23ME82**
L-T-P STRUCTURE	**:** 3-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**: Mr. J. Subba Reddy, Associate Professor in Mechanical Engineering**
COURSE COORDINATOR	**: Mr. J. Subba Reddy, Associate Professor in Mechanical Engineering**
PER-REQUISITE	**:** Engineering Mechanics & Kinematics of Machines

COURSE EDUCATIONAL OBJECTIVES:

This course introduces students to the fundamental components and applications of industrial robotic systems. It covers various types of actuators, robot kinematics, and control programming principles. Additionally, students will explore the role of image processing and machine vision in enhancing robotic functionality.

COURSE OUTCOMES: At the end of the course, the student will be able to

- **CO1:** Comprehend the anatomy of a robot and identify the components, configurations, and industrial applications of robotic systems. **(Understanding – L2)**
- **CO2:** Describe the types, characteristics, and selection criteria of actuators and sensors used in robotic systems. **(Understanding – L2)**
- **CO3:** Apply D-H parameters to solve forward and inverse kinematics of robotic manipulators. **(Applying – L3)**
- **CO4:** Demonstrate the principles of trajectory planning, learn robot programming, and utilize programming languages for robot control. **(Applying – L3)**
- **CO5:** Describe the principles and applications of image processing and machine vision in robotics. **(Understanding – L2)**

COURSE ARTICULATION MATRIX (Correlation between COs & POs, PSOs):

COs	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	PSO 3
CO1	3					2						2		2	3
CO2	3	3	2									2		2	3
CO3	3	3	2									2		2	3
CO4	3	2	1				2					2		2	2
CO5	2					3	3					1	2	2	2

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 -** Moderate (Medium), **3 -** Substantial (High).

TEXT BOOKS

1. Saeed B.Niku, Introduction to robotics- analysis, systems &application, Second Edition, Willy India Private Limited, New Delhi,2011.
2. R.K.Mittal and IJ Nagrath, Robotics and Control, Tata McGraw–Hill Publishing company Limited, New Delhi, 2003.

REFERENCES

1. Mikell P.Groover, Mitchell Weiss, Roger N. Nagel and Nicholas G. Odrey,Ashish Dutta, Industrial Robotics, Second Edition McGraw- Hill Education (India) PrivateLimited,2012
2. Robert J.Schilling, Fundamentals of robotics analysis & control, PHI learning private Limited, New Delhi,4thEdition 2002
3. John.JCriag, Introduction to Robotics-Mechanics and Control, Third Edition, Pearson Education,Inc., 2008.

SYLLABUS:

UNIT I: INTRODUCTION TO ROBOTICS AND ROBOT ANATOMY

INTRODUCTION: Overview of Robotics in the context of Automation, CAD/CAM, and Industry 4.0 – Evolution of Robotics – Present and emerging applications in smart manufacturing, healthcare, logistics, and AI-driven systems – Classification of robots based on coordinate and control systems.

ROBOT ANATOMY & STRUCTURE: Components of a robotic system – Robot structure, degrees of freedom, workspace – Robot drive systems and kinematic chains – Block diagram and signal flow representation – Types of arms and their configuration – End-effectors: types, design challenges, and selection criteria.

UNIT II: ACTUATION AND SENSOR SYSTEMS FOR ROBOTICS

ACTUATORS: Working principles and control of pneumatic, hydraulic, and electrical actuators – Stepper and servo motors – Comparison of actuation methods with respect to cost, performance, and integration with embedded systems.

SENSORS AND FEEDBACK COMPONENTS: Role of sensors in robotic perception and control – Position sensors (potentiometers, encoders, resolvers), velocity sensors – Feedback mechanisms in robotic systems – Integration with microcontrollers and data acquisition systems.

UNIT III: ROBOT KINEMATICS AND TRANSFORMATIONS

MOTION ANALYSIS: Coordinate transformations – Homogeneous transformations for rotation and translation in 2D/3D space – Transformation matrices.

MANIPULATOR KINEMATICS: Denavit–Hartenberg (D-H) parameters – Forward and inverse kinematics for articulated manipulators – Joint space vs task space – Solving kinematics using programming approaches (Python/Matlab/ROS).

UNIT IV: PATH PLANNING AND ROBOT PROGRAMMING

TRAJECTORY PLANNING: Basics of trajectory generation – Obstacle avoidance strategies – Motion interpolation (joint, linear, and circular paths) – Skew motion and joint-integrated motion.

PROGRAMMING AND SIMULATION: Introduction to robot programming languages (e.g., Python, RAPID, URScript) – Overview of simulation platforms such as RoboDK, ROS, and Gazebo – Basics of software stacks for robot control and path execution.

UNIT V: MACHINE VISION AND IMAGE PROCESSING FOR ROBOTICS

MACHINE VISION SYSTEMS: Concepts of sensing and digitization – Vision system architecture – Image preprocessing, feature extraction, and object recognition.

ROBOTIC APPLICATIONS: Applications of machine vision in navigation, inspection, pick-and-place, quality control, and autonomous systems – Introduction to Open CV and AI models in vision tasks – Training vision systems using supervised and unsupervised learning techniques.

COURSE DELIVERY PLAN (LESSON PLAN): INTRODUCTION TO INDUSTRIAL ROBOTICS (23ME82)

PART - B

UNIT-I: INTRODUCTION TO ROBOTICS AND ROBOT ANATOMY

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
1.	**Introduction to Industrial Robotics,** CEOs, Course Outcomes, POs and PSOs	1	30-06-2025		**TLM2**	CO1	T1, T2, R1, R2	
2.	**INTRODUCTION:** Overview of Robotics in the context of Automation, CAD/CAM, and Industry 4.0	1	02-07-2025		**TLM2**	CO1	T1, T2, R1, R2	
3.	Evolution of Robotics – Present and emerging applications in smart manufacturing, healthcare, logistics, and AI-driven systems, Classification of robots based on coordinate systems and control systems	1	05-07-2025		**TLM2**	CO1	T1, T2, R1, R2	
4.	**ROBOT ANATOMY & STRUCTURE**: Components of a robotic system – Robot structure, Degrees of freedom, workspace	1	07-07-2025		**TLM2**	CO1	T1, T2, R1, R2	
5.	Robot drive systems and kinematic chains – Block diagram and signal flow representation, Types of arms and their configuration	1	09-07-2025		**TLM2**	CO1	T1, T2, R1, R2	
6.	Types of End Effectors – Mechanical Grippers, Vacuum Cups, Magnetic Grippers, Adhesive Grippers and others	1	12-07-2025		**TLM2**	CO1	T1, T2, R1, R2	
7.	Robot / End effectors interface, Design challenges of end effectors and selection criteria	1	14-07-2025		**TLM2**	CO1	T1, T2, R1, R2	
8.	Case Studies, Numericals, **Tutorial**	1	16-07-2025		**TLM2**	CO1	T1, T2, R1, R2	
9.	Numericals	1	19-07-2025		**TLM3**	CO1	T1, T2, R1, R2	
Number of classes required to complete UNIT-I:		**09**			**No. of classes taken:**			

UNIT-II: ACTUATION AND SENSOR SYSTEMS FOR ROBOTICS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
10.	**ACTUATORS:** Introduction to Actuators, Characteristics of the Actuating System	1	21-07-2025		**TLM2**	CO2	T1,R1	
11.	Working principles and control of pneumatic actuators	1	23-07-2025		**TLM2**	CO2	T1,R1	
12.	Working principles and control of hydraulic actuators	1	26-07-2025		**TLM2**	CO2	T1,R1	
13.	Working principles and control of electrical actuators: Stepper and Servo motors	1	28-07-2025		**TLM2**	CO2	T1,R1	
14.	Comparison of actuation methods with respect to cost, performance, and integration with embedded systems.	1	30-07-2025		**TLM2**	CO2	T1,R1	
15.	**SENSORS AND FEEDBACK COMPONENTS:** Introduction to Sensors, Sensor characteristics, Role of sensors in robotic perception and control	1	02-08-2025		**TLM3**	CO2	T1,R1	
16.	Position sensors (potentiometers, encoders, resolvers), velocity sensors	1	04-08-2025		**TLM1**	CO2	T1,R1	
17.	Feedback mechanisms in robotic systems, Integration with microcontrollers and data acquisition systems.	1	06-08-2025		**TLM1**	CO2	T1,R1	
18.	Industrial Applications, **Tutorial,** Case Studies	1	09-08-2025		**TLM1**	CO2	T1,R1	
Number of classes required to complete UNIT-II		**09**		**No. of classes taken:**				

UNIT III: ROBOT KINEMATICS AND TRANSFORMATIONS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
19.	**MOTION ANALY**SIS: Introduction to Manipulator Kinematics, Coordinate Frames, Description of Objects in Space	1	11-08-2025		**TLM2**	CO3	T1,R1	
20.	Coordinate transformations – Homogeneous transformations for rotation and translation in 2D/3D space	1	13-08-2025		**TLM2**	CO3	T1,R1	

21.	Transformation matrices, Numericals, Fundamental Rotation Matrices, Numericals	1	16-08-2025		**TLM2**	CO3	T1,R1	
22.	Inverting a Homogeneous Transform, **Tutorial**	1	18-08-2025		**TLM2**	CO3	T1,R1	
23.	Representation of Robotic Configurations in HTM form, Numericals	1	16-08-2025		**TLM2**	CO3	T1,R1	
24.	**MANIPULATOR KINEMATICS:** Denavit–Hartenberg (D-H) parameters – Forward and inverse kinematics for articulated manipulators	1	18-08-2025		**TLM2**	CO3	T1,R1	
	I Mid Examinations	06	**25-08-2025 to 30-08-2025**		**TLM6**	CO1 to CO3	T1,R1	
25.	D-H representation for 2D/3D Robotic configurations, Numericals	1	01-09-2025		**TLM2**	CO3	T1,R1	
26.	Problems on Forward Kinematics	1	03-09-2025		**TLM2**	CO3	T1,R1	
27.	Joint space vs task space – Solving kinematics using programming approaches (Python/MATLAB/ROS)	1	06-09-2025		**TLM2**	CO3	T1,R1	
28.	Numericals,	1	08-09-2025		**TLM2**	CO3	T1,R1	
29.	Numericals	1	10-09-2025		**TLM2**	CO3	T1,R1	
30.	Numericals **Tutorial**	1	13-09-2025		**TLM2**	CO3	T1,R1	
Number of classes required to complete UNIT-III		**12**			**No. of classes taken:**			

UNIT IV: PATH PLANNING AND ROBOT PROGRAMMING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Textbook followed	HOD Sign Weekly
31.	**TRAJECTORY PLANNING:** Basics of trajectory generation – Obstacle avoidance strategies	1	15-09-2025		**TLM2**	CO4	T1,R1	
32.	Motion interpolation (joint, linear, and circular paths)	1	17-09-2025		**TLM2**	CO4	T1,R1	
33.	Numericals, **Tutorial**	1	20-09-2025		**TLM2**	CO4	T1,R1	
34.	Skew motion and joint-integrated motion, Numericals	1	22-09-2025		**TLM2**	CO4	T1,R1	
35.	Numericals	1	24-09-2025		**TLM2**	CO4	T1,R1	

36.	**PROGRAMMING AND SIMULATION:** Introduction to robot programming languages (e.g., Python, RAPID, URScript)	1	27-09-2025		**TLM2**	CO4	T1,R1	
37.	Overview of simulation platforms such as RoboDK, ROS, and Gazebo	1	29-09-2025		**TLM2**	CO4	T1,R1	
38.	Basics of software stacks for robot control and path execution.	1	01-10-2025		**TLM2**	CO4	T1,R1	
39.	Case Studies	1	04-10-2025		**TLM2**	CO4	T1,R1	
No. of classes required to complete UNIT-IV		**09**			**No. of classes taken:**			

UNIT-V: MACHINE VISION AND IMAGE PROCESSING FOR ROBOTICS

40.	**MACHINE VISION SYSTEMS**: Concepts of sensing and digitization	1	06-10-2025		**TLM1**	CO4	T1,R1	
41.	Vision system architecture	1	08-10-2025		**TLM1**	CO4	T1,R1	
42.	Image preprocessing, feature extraction, and object recognition	1	11-10-2025		**TLM2**	CO4	T1,R1	
43.	**ROBOTIC APPLICATIONS**: Applications of machine vision in navigation, inspection	1	13-10-2025		**TLM1**	CO4	T1,R1	
44.	Pick-and-place, quality control, and autonomous systems	1	15-10-2025		**TLM2**	CO4	T1,R1	
45.	Introduction to OpenCV and AI models in vision tasks	1	18-10-2025		**TLM2**	CO4	T1,R1	
46.	Training vision systems using supervised and unsupervised learning techniques	1	20-10-2025		**TLM1**	CO4	T1,R1	
47.	Numericals, Tutorial	1	22-10-2025		**TLM2**	CO4	T1,R1	
48.	Training vision systems using supervised learning techniques	1	25-10-2025		**TLM2**	CO4	T1,R1	
49.	Training vision systems using unsupervised learning techniques	1	27-10-2025		**TLM2**	CO4	T1,R1	
50.	Applications for Assembly and Inspection, Future Applications	1	29-10-2025		**TLM2**	CO4	T1,R1	
51.	Revision, Content beyond the syllabus	1	01-11-2025		**TLM2**	CO4	T1,R1	
No. of classes required to complete UNIT-V		**12**			**No. of classes taken:**			
II Mid Examinations		**06**	**03-11-2025 to 08-11-2025**					

TEACHING LEARNING METHODS:

TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/ Project/Assignment/Quiz

ACADEMIC CALENDAR:

Commencement of V Semester Classwork		**30-06-2025**	
I Phase of Instructions	**30-06-2025**	**23-08-2025**	**8 Weeks**
I Mid Examinations	**25-08-2025**	**30-08--2025**	**1 Week**
II Phase of Instructions	**01-09-2025**	**01-11-2025**	**9 Weeks**
II Mid Examinations	**03-11-2025**	**08-11-2025**	**1 Week**
Preparation and Practicals	**10-11-2025**	**15-11-2025**	**1 Week**
Semester End Examinations	**17-11-2025**	**29-11-2025**	**2 Weeks**

PART – C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=05
Assignment/Quiz – 2	2	A2=05
I-Mid Examination	1, 2, 3 (1/2)	**B1=15**
I-Online Mid Examination	1, 2, 3	**C1=10**
Assignment/Quiz – 3	3	A3=05
Assignment/Quiz – 4	4	A4=05
Assignment/Quiz – 5	5	A5=05
II-Mid Examination	3(1/2), 4, 5	**B2=15**
II-Online Mid Examination	3(1/2), 4, 5	**C2=10**
Evaluation of Assignment/Quiz Marks: A =(A1+A2+A3+A4+A5)/5	1, 2, 3, 4, 5	**A=05**
Evaluation of Mid Marks: B=75% of Max(B1,B2) + 25% of Min(B1,B2)	1, 2, 3, 4, 5	**B=15**
Evaluation of Online Mid Marks: C=75% of Max(C1,C2) + 25% of Min(C1,C2)	1, 2, 3, 4, 5	**C=10**
Cumulative Internal Examination: A+B+C	**1, 2, 3, 4, 5**	**A+B+C=30**
Semester End Examinations: D	**1, 2, 3, 4, 5**	**D=70**
Total Marks: A+B+C+D	**1, 2, 3, 4, 5**	**100**

PART – D

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: Pursue a successful career in the area of Information Technology or its allied fields.

PEO2: Exhibit sound knowledge in the fundamentals of Information Technology and apply practical experience with programming techniques to solve real-world problems.

PEO3: Demonstrate self-learning, life-long learning, and work in teams on multidisciplinary projects.

PEO4: Understand the professional code of ethics and demonstrate ethical behaviour, effective communication, teamwork, and leadership skills in their job.

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

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

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

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

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

10. 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.

11. 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.

12. 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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1: Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO2: Design, implement and evaluate a computer-based system to meet desired needs.
PSO3: Develop IT application services with the help of different current engineering tools.

Signature				
Faculty Name	**Mr. J. Subba Reddy**	**Mr. J.Subba Reddy**	**Mr. J.Subba Reddy**	**Dr. D. Ratna Kishore**
Designation	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Professor & HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
Autonomous Status Extended up to the Academic Year 2031-32
NAAC Accredited with CGPA of 3.20 on 4-point scale at 'A' Grade
NBA Accredited under Tier-I (CSE, IT, ECE, EEE, ME, CIV & ASE)
ISO 21001:2018, 50001:2018,14001:2015 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, N.T.R Dist., Andhra Pradesh, India.
Department of Electronics & Communication Engineering

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr.V.V.Rama Krishna Date:30-07-2025
Course Name & Code : **Fundamentals of Satellite Communications-23EC85**
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech, IT, V-Sem A.Y : 2025-26
PRE-REQUISITE :Dynamics, Kinematics, Thermo dynamics.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course provides the knowledge on laws associated with the motion of a satellite, launching a satellite into orbit with launch vehicles, subsystems, structures, spacecraft control and applications.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	**Describe** the operational frequency bands, Space craft control mechanisms**,** sensors and navigational aids used in satellite systems **Understand-L2)**
CO 2	**Summarize** the functions of satellite space segment, earth segment, Multiple access techniques and satellite services. **(Understand-L2)**
CO 3	I **Illustrate** the operational principles of satellite power system and space craft Control mechanism. **(Understand-L2)**
CO 4	**Apply** the fundamental concepts oforbital mechanics&satellite communication and its application **(Apply-L3)**

COURSE ARTICULATION MATRIX(Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	3	2	-	-	-	-	1	1	-	-
CO2	1	1	1	-	-	2	1	-	-	-	-	1	2	-	-
CO3	1	1	1	-	-	2	1	-	-	-	-	1	2	-	-
CO4	1	1	1	-	-	2	1	-	-	-	-	1	2	-	-

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2** – Moderate (Medium), **3** - Substantial (High).

TEXT BOOKS:

T1 Timothy Pratt, Charles Bostian, Jeremy Allnutt, "Satellite communications", John Wiley & Sons,2"[d] edition,2003.

T2 Dennis Roddy, "Satellite communications", Tata McGraw Hills, 4th Edition, 2009.

REFERENCE BOOKS:

R1 M. Richharia, "Satellite Communications Systems: Design principles", BS Publications,2' [d] Edition, 2005.

R2 D.C Agarwal, "Satellite communications", Khanna Publications, 5*Edition,2006.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Satellite Systems

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Course Objectives	1	01-07-2025		TLM1	
2.	Brief introduction about the course and its importance.	1	03-07-2025		TLM1	
3.	Need of space communication,	1	04-07-2025		TLM1	
4.	General Structure of satellite Communication system- **(Flipped Classroom)**	1	08-07-2025		TLM2	
5.	Types of Spacecraft Orbits, Launch vehicles.	1	10-07-2025		TLM1	
6.	Satellite subsystems and their functions – structure.	1	11-07-2025		TLM2	
7.	Satellite subsystems and their functions – thermal mechanisms.	1	15-07-2025		TLM2	
8.	Satellite subsystems and their functions – power, propulsion.	1	17-07-2025		TLM2	
9.	Satellite subsystems and their functions – Guidance and control.	1	18-07-2025		TLM1	
10.	Satellite subsystems and their functions – bus electronics.	1	22-07-2025		TLM1	
11.	Communication bands-characteristics and applications. **(Peer Teaching and Collaborative Learning)**	1	24-07-2025		TLM2	
12.	Revision of I Unit		25-07-2025		TLM1	
No. of classes required to complete UNIT-I:12				No. of classes taken:		

UNIT-II: Orbital Mechanics and satellite launching

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Fundamentals of Orbital Dynamics – Kepler 's laws.	1	29-07-2025		TLM1	
2.	Fundamentals of Orbital Dynamics – Kepler's laws	1	31-07-2025		TLM1	
3.	Orbital parameters	1	01-08-2025		TLM2	
4.	Orbital parameters		05-08-2025		TLM2	
5.	Problems	1	07-08-2025		TLM1	
6.	Orbital Perturbations	1	08-08-2025		TLM2	
7.	Orbital Perturbations **(Blended Learning)**		12-08-2025		TLM2	
8.	Need for station keeping. (**Simulation using NASA Eyes on the Solar System**)	1	14-08-2025		TLM2	
9.	Orbital effect	1	19-08-2025		TLM1	
10.	Launch Vehicles **(Visual Thinking Tools)**		21-08-2025		TLM2	

11.	Reusable Launch Vehicles.	1	22-08-2025		TLM2	
No. of classes required to complete UNIT-II: 11				No. of classes taken:		

UNIT-III: Power System and Bus Electronics

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Solar Panels: Silicon and Ga-As Cells.	1	02-09-2025		TLM2	
2.	Power generation capacity, efficiency.	1	04-09-2025		TLM2	
3.	Space Battery System Battery Types	1	05-09-2025		TLM2	
4.	Characteristics efficiency Parameters	1	09-09-2025		TLM1	
5.	Power electronics.	1	11-09-2025		TLM2	
6.	Telemetry of satellite	1	12-09-2025		TLM2	
7.	Command Control	1	16-09-2025		TLM2	
8.	monitoring functions**(Interactive Quizzes & Polls)**	1	18-09-2025		TLM2	
9.	Control Functions	1	19-09-2025		TLM1	
No. of classes required to complete UNIT-III: 09				No. of classes taken:		

UNIT-IV : Spacecraft Control:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Control Requirements: Attitude Control	1	23-09-2025		TLM1	
2.	Station keeping functions,	1	25-09-2025		TLM1	
3.	Type of control maneuvers.	1	26-09-2025		TLM1	
4.	Stabilization Schemes: Spin stabilization.	1	30-09-2025		TLM2	
5.	Stabilization Schemes: gravity gradient method, 3 axis stabilization.	1	02-10-2025		TLM2	
6.	Mass expulsion systems**.- Flipped Classroom**	1	03-10-2025		TLM2	
7.	Control Systems: Momentum exchange systems.	1	07-10-2025		TLM1	
8.	Gyro and Magnetic Torque - sensors, Star and sun sensor, Earth sensor. (**Blended Learning Approach, Visual and quiz)**	1	09-10-2025		TLM2	
9.	Magnetometers and Inertial Sensors.	1	10-10-2025		TLM2	
No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V : Satellite services and applications

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction to Satellite services and applications	1	14-10-2025		TLM2	
2.	GPS location and principle.	1	16-10-2025		TLM2	

3.	Direct to Home, Home receiver- Interactive Quizzes	1	17-10-2025		TLM2	
4.	Satellite Mobile Services: VSAT.	1	21-10-2025		TLM2	
5.	RADARSAT.	1	23-10-2025		TLM2	
6.	IRNSS constellation. .(**Visual Learning**)	1	24-10-2025		TLM2	
7.	Satellite structures and materials.	1	28-10-2025		TLM2	
No. of classes required to complete UNIT-V: 07				No. of classes taken:		

Contents beyond the Syllabus:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Information about NaviC & some recently launched satellites information.	1	30-10-2025		TLM2	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	40
Semester End Examination (SEE)	60
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**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
PO 7	**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.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**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.
PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	**Communication:** Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO 2	**VLSI and Embedded Systems:** Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools
PSO 3	**Signal Processing:** Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

Course Instructor	Course Coordinator	Module Coordinator	HOD
V V Ramakrishna	V V Ramakrishna	Dr.M.Venkata Sudhakar	Dr.G.Srinivasulu

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An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
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COURSE HANDOUT

PART-A

Name of Course Instructor : B. SARATH CHANDRA
Course Name & Code : Advanced Java LAB (23IT54) R23
L-T-P Structure : 3-0-0 **Credits**: 3
Program/Sem/Sec : B.Tech., IT., V-Sem. A Secion, **A.Y** : 2025-26

PRE-REQUISITE: Object Oriented Programming through JAVA

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objectives of this lab course are to introduce

- To make use of Servlet and JSP API in the process of enterprise application deployment.
- Implement components such as JSTL
- Distinguish Application Server, Web Container, JDBC
- Design and Development of web application having collaboration of Servlets, JSPs, Spring.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Implement database operations using JDBC with different types of statements and manage transactions effectively.
CO 2	Develop and deploy server-side programs using Servlets for handling client requests and session tracking.
CO 3	Create dynamic and interactive web pages using JSP and JSTL for data display and user interaction.
CO 4	Demonstrate the use of various JSTL tags including core, format, function, and SQL tags in JSP applications.
CO 5	Design and implement MVC-based web applications using the Spring Framework with database and transaction support.

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1				1								3		3
CO2	2				1								3	3	3
CO3	1				3								3	3	3
CO4	2				2								3	3	3
CO5	3				2								2	3	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

e-Resources :

1) https://infyspringboard.onwingspan.com/web/en/viewer/video/lex_auth_013843135610560512

31666_shared?collectionType=Collection&collectionId=lex_auth_013843138888944947231668_shared&pathId=

2) https://infyspringboard.onwingspan.com/web/en/viewer/video/lex_auth_013843302593060864 35241_shared?collectionType=Course&pathId=lex_auth_0138432965077155843524 2_shared&collectionId=lex_auth_013843300350369792360 02_shared

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: JDBC Programming

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	JDBC Application using Statement object	3	01-07-2025		TLM5, TLM8	
2.	JDBC Application using PreparedStatement object	3	08-07-2025		TLM5, TLM8	
3.	JDBC Application for executing Store Procedures	3	15-07-2025		TLM5, TLM8	
4.	JDBC Application for executing Store Procedures	3	22-07-2025		TLM5, TLM8	
5.	JDBC application which will demonstrate Scrollable ResultSet & Updatable ResultSet functionality	3	29-07-2025		TLM5, TLM8	
6.	Program for testing the action to Servlet and Servlet collaboration and study deployment descriptor.	3	05-08-2025		TLM5, TLM8	
7.	Program for testing the action to Servlet and Servlet collaboration and study deployment descriptor.	3	12-08-2025		TLM5, TLM8	
8.	login form and perform state management using Cookies, HttpSession and URL Rewriting.	3	19-08-2025		TLM5, TLM8	
9.	Program in which input the two numbers in an html file and then display the addition in JSP file.	3	02-09-2025		TLM5, TLM8	
10.	Perform Database Access through JSP	3	09-09-2025		T TLM5, TLM8	
11.	Perform Database Access through JSP	3	16-09-2025		TLM5, TLM8	
12.	Program which demonstrates the core tag of JSTL, Format tag of JSTL.	3	23-09-2025		TLM5, TLM8	

13.	Program which demonstrates the Function tag of JSTL SQL tag of JSTL.	3	07-10-2025		TLM5, TLM8	
14.	Study and Implement MVC using Spring Framework	3	14-10-2025		TLM5, TLM8	
15.	Using Spring Template manage Database and Transaction.	3	28-10-2025		TLM5, TLM8	
No. of classes required to complete UNIT-I: 48				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Problem Solving
TLM2	PPT	**TLM5**	Programming
TLM3	Tutorial	**TLM6**	Assignment or Quiz
TLM7	Seminars or GD	**TLM8**	Lab Demo
TLM9	Case Study		

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
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PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	Mr.B.SARATH CHANDRA	Mr.B.SARATH CHANDRA	Dr. Phaneendra K	Dr. D. Ratna Kishore
Signature				

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COURSE HANDOUT

PART-A

Name of Course Instructor : B. SARATH CHANDRA
Course Name & Code : Advanced Java LAB (23IT54) R23
L-T-P Structure : 3-0-0 **Credits**: 3
Program/Sem/Sec : B.Tech., IT., V-Sem. B Secion, **A.Y** : 2025-26

PRE-REQUISITE: Object Oriented Programming through JAVA

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objectives of this lab course are to introduce

- To make use of Servlet and JSP API in the process of enterprise application deployment.
- Implement components such as JSTL
- Distinguish Application Server, Web Container, JDBC
- Design and Development of web application having collaboration of Servlets, JSPs, Spring.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Implement database operations using JDBC with different types of statements and manage transactions effectively.
CO 2	Develop and deploy server-side programs using Servlets for handling client requests and session tracking.
CO 3	Create dynamic and interactive web pages using JSP and JSTL for data display and user interaction.
CO 4	Demonstrate the use of various JSTL tags including core, format, function, and SQL tags in JSP applications.
CO 5	Design and implement MVC-based web applications using the Spring Framework with database and transaction support.

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1				1								3		3
CO2	2				1								3	3	3
CO3	1				3								3	3	3
CO4	2				2								3	3	3
CO5	3				2								2	3	3

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1) https://infyspringboard.onwingspan.com/web/en/viewer/video/lex_auth_013843135610560512

31666_shared?collectionType=Collection&collectionId=lex_auth_013843138888944947231668_shared&pathId=

2) https://infyspringboard.onwingspan.com/web/en/viewer/video/lex_auth_013843302593060864 35241_shared?collectionType=Course&pathId=lex_auth_013843296507715584352 42_shared&collectionId=lex_auth_013843300350369792360 02_shared

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: JDBC Programming

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	JDBC Application using Statement object	3	03-07-2025		TLM5, TLM8	
2.	JDBC Application using PreparedStatement object	3	10-07-2025		TLM5, TLM8	
3.	JDBC Application for executing Store Procedures	3	17-07-2025		TLM5, TLM8	
4.	JDBC Application for executing Store Procedures	3	24-07-2025		TLM5, TLM8	
5.	JDBC application which will demonstrate Scrollable ResultSet & Updatable ResultSet functionality	3	31-07-2025		TLM5, TLM8	
6.	Program for testing the action to Servlet and Servlet collaboration and study deployment descriptor.	3	07-08-2025		TLM5, TLM8	
7.	Program for testing the action to Servlet and Servlet collaboration and study deployment descriptor.	3	14-08-2025		TLM5, TLM8	
8.	login form and perform state management using Cookies, HttpSession and URL Rewriting.	3	21-08-2025		TLM5, TLM8	
9.	Program in which input the two numbers in an html file and then display the addition in JSP file.	3	04-09-2025		TLM5, TLM8	
10.	Perform Database Access through JSP	3	11-09-2025		T TLM5, TLM8	
11.	Perform Database Access through JSP	3	18-09-2025		TLM5, TLM8	
12.	Program which demonstrates the core tag of JSTL, Format tag of JSTL.	3	25-09-2025		TLM5, TLM8	

13.	Program which demonstrates the Function tag of JSTL SQL tag of JSTL.	3	09-10-2025		TLM5, TLM8	
14.	Study and Implement MVC using Spring Framework	3	16-10-2025		TLM5, TLM8	
15.	Study and Implement MVC using Spring Framework	3	23-10-2025		TLM5, TLM8	
16.	Using Spring Template manage Database and Transaction.	3	30-10-2025		TLM5, TLM8	
No. of classes required to complete UNIT-I: 48				No. of classes taken:		

PART-C

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
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PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mr.B.SARATH CHANDRA	Mr.B.SARATH CHANDRA	Dr. Phaneendra K	Dr. D. Ratna Kishore
Signature				

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PROGRAM : B.Tech.,V-Sem,Sec-A, IT – R23 Regulation

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : Computer Networks Lab–23CS58

L-T-P STRUCTURE : 0-0-3

COURSE CREDITS : 1.5

COURSE INSTRUCTOR : B.Ravindra chanti babu

PRE-REQUISITE : Python,C++

COURSE OBJECTIVE: Learn basic concepts of computer networking and acquire practical notions of protocols with the emphasis on TCP/IP. A lab provides a practical approach to Ethernet/Internet networking: networks are assembled, and experiments are made to understand the layered architecture and how do some important protocols work.

COURSE OUTCOMES (CO)

CO1: Apply fundamental networking concepts by configuring network devices, analysing protocols, and implementing data link layer techniques. **(Apply – L3)**

CO2: Implement various network algorithms, including error detection, congestion control, routing, and shortest path computation. **(Apply – L3)**

CO3: Analyze network traffic, security vulnerabilities, and performance metrics using tools like Wireshark, Nmap, and NS2 Simulator. **(Apply – L3)**

CO4: Improve individual / teamwork skills, communication & report writing skills with ethical values.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

COs	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	PSO 3
CO1	**3**	**2**	**3**	**2**	**3**							**1**	**3**	**2**	
CO2	**3**	**3**	**3**	**3**	**2**							**1**	**3**	**3**	
CO3	**3**	**3**	**2**	**3**	**3**							**2**	**3**	**3**	
CO4								**3**	**3**	**3**		**3**	**2**		

BOS APPROVED TEXT BOOKS:

T1 B. A. Frouzan, Data Communication, Tata Mc Graw Hill.

T2 A. S. Tanenbaum —Computer Network: Second Ed. Prentice Hall, India (tan).

BOS APPROVED REFERENCE BOOKS:

R1 William Stallings, "Data and Computer Communication", Pearson Prentice Hall India, 8 th Edition.

R2 Douglas Comer, Internetworking with TCP/IP, Prentice Hall of India, Volume 1, 6th Edition, 2009.

R3 Richard Stevens, "TCP/IP Illustrated" , Addison-Wesley, Volume 1, 2001.

R4 http://www.cse.iitk.ac.in/users/dheeraj/cs425/.

R5 http://www.tcpipguide.com/free/t_OSIReferenceModelLayers.htm

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Programs to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Study of Network devices in detail and connect the computers in Local Area Network.	3	02-07-2025		**TLM8/TLM5**	
2.	Program to implement the data link layer farming methods such as i) Character stuffing ii) Bit stuffing.	3	09-07-2025		**TLM8/TLM5**	
3.	Program to implement data link layer farming method checksum.	3	16-07-2025		**TLM8/TLM5/TLM4**	
4.	Program for Hamming Code generation for error detection and correction.	6	23-07-2025		**TLM8/TLM5/TLM4**	
5.	Program to implement on a data set of characters the three CRC polynomials-CRC 12,CRC 16	3	30-07-2025		**TLM8/TLM5/TLM4**	
6.	Program to implement Sliding window protocol for Goback N.	3	06-08-2025		**TLM8/TLM5**	
7.	Program to implement Sliding window protocol for Selective	3	13-08-2025		**TLM8/TLM5**	

	repeat.					
8.	Program to implement Stop and Wait Protocol.	3	20-08-2025		**TLM8/TLM5**	
9.	Program for congestion control using leaky bucket algorithm.	3	03-09-2025		**TLM8/TLM5**	
10.	Program to implement Distance vector routing algorithm by obtaining routing table at each node	3	10-09-2025		**TLM8/TLM5**	
11.	Wireshark Packet Capture Using Wire shark Starting Wire shark Viewing Captured Traffic Analysis and Statistics & Filters.	3 + 3	17-09-2025 01-10-2025		**TLM8/TLM5**	
12.	Do the following using NS3 Simulator NS3 Simulator-Introduction Simulate to Find the Number of Packets Dropped Simulate to Find the Number of Packets Dropped by TCP/UDP Simulate to Find the Number of Packets Dropped due to Congestion Simulate to Compare Data Rate& Throughput	3 + 3	08-10-2025 15-10-2025		**TLM8/TLM5**	
13.	**Lab-Internal-**	3	22-10-2025			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	30-06-2025		
I Phase of Instructions	30-06-2025	23-08-2025	8W
I Mid Examinations	25-08-2025	30-08-2025	1W
II Phase of Instructions	01-09-2025	01-11-2025	9W
II Mid Examinations	03-11-2025	08-11-2025	1W
Preparation and Practical's	10-11-2025	15-11-2025	1W
Semester End Examinations	17-11-2025	29-11-2025	2W

EVALUATION PROCESS:

Evaluation Task	Marks
Day to Day Work	15
Internal Lab Exam	15
Continuous Internal Assessment (CIA)	30
Procedure	20
Execution & Results	30
Viva Voice	**20**
Semester End Examinations	**70**
Total Marks: CIE + SEE	**100**

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PO 11	**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.
PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Mr.B.Ravindra chanti babu	**Dr.B. Siva Rama Krishna**	**Mr.G.Rajendra**	**Dr.D. Ratna Kishore**
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PROGRAM : B.Tech.,V-Sem-B, IT – R23 Regulation

ACADEMIC YEAR : 2025-26

COURSE NAME & CODE : Computer Networks Lab–23CS58

L-T-P STRUCTURE : **0**-0-3

COURSE CREDITS : 1.5

COURSE INSTRUCTOR : **Rajasekhar Kommaraju**

PRE-REQUISITE : **Python,C++**

COURSE OBJECTIVE: Learn basic concepts of computer networking and acquire practical notions of protocols with the emphasis on TCP/IP. A lab provides a practical approach to Ethernet/Internet networking: networks are assembled, and experiments are made to understand the layered architecture and how do some important protocols work.

COURSE OUTCOMES (CO)

CO1: Apply fundamental networking concepts by configuring network devices, analysing protocols, and implementing data link layer techniques. **(Apply – L3)**

CO2: Implement various network algorithms, including error detection, congestion control, routing, and shortest path computation. **(Apply – L3)**

CO3: Analyze network traffic, security vulnerabilities, and performance metrics using tools like Wireshark, Nmap, and NS2 Simulator. **(Apply – L3)**

CO4: Improve individual / teamwork skills, communication & report writing skills with ethical values.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

COs	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	PSO 3
CO1	**3**	**2**	**3**	**2**	**3**							**1**	**3**	**2**	
CO2	**3**	**3**	**3**	**3**	**2**							**1**	**3**	**3**	
CO3	**3**	**3**	**2**	**3**	**3**							**2**	**3**	**3**	
CO4								**3**	**3**	**3**		**3**	**2**		
1- Slight (Low), **2 -** Moderate (Medium), **3 -** Substantial (High).															

BOS APPROVED TEXT BOOKS:

T1 B. A. Frouzan, Data Communication, Tata Mc Graw Hill.

T2 A. S. Tanenbaum –Computer Network: Second Ed. Prentice Hall, India (tan).

BOS APPROVED REFERENCE BOOKS:

R1 William Stallings, "Data and Computer Communication", Pearson Prentice Hall India, 8 th Edition.

R2 Douglas Comer, Internetworking with TCP/IP, Prentice Hall of India, Volume 1, 6th Edition, 2009.

R3 Richard Stevens, "TCP/IP Illustrated" , Addison-Wesley, Volume 1, 2001.

R4 http://www.cse.iitk.ac.in/users/dheeraj/cs425/.

R5 http://www.tcpipguide.com/free/t_OSIReferenceModelLayers.htm

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Programs to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Study of Network devices in detail and connect the computers in Local Area Network.	3	04-07-2025		**TLM8/TLM5**	
2.	Program to implement the data link layer farming methods such as i) Character stuffing ii) Bit stuffing.	3	11-07-2025		**TLM8/TLM5**	
3.	Program to implement data link layer farming method checksum.	3	18-07-2025		**TLM8/TLM5/TLM4**	
4.	Program for Hamming Code generation for error detection and correction.	6	25-07-2025		**TLM8/TLM5/TLM4**	
5.	Program to implement on a data set of characters the three CRC polynomials-CRC 12,CRC 16	3	01-08-2025		**TLM8/TLM5/TLM4**	
6.	Program to implement Sliding window protocol for Goback N.	3	08-08-2025		**TLM8/TLM5**	
7.	Program to implement Sliding window protocol for Selective repeat.	3	22-08-2025		**TLM8/TLM5**	

8.	Program to implement Stop and Wait Protocol.	3	05-09-2025		**TLM8/TLM5**	
9.	Program for congestion control using leaky bucket algorithm.	3	12-09-2025		**TLM8/TLM5**	
10.	Program to implement Distance vector routing algorithm by obtaining routing table at each node	3	19-09-2025		**TLM8/TLM5**	
11.	Wireshark Packet Capture Using Wire shark Starting Wire shark Viewing Captured Traffic Analysis and Statistics & Filters.	3 + 3	26-09-2025 03-10-2025		**TLM8/TLM5**	
12.	Do the following using NS3 Simulator NS3 Simulator-Introduction Simulate to Find the Number of Packets Dropped Simulate to Find the Number of Packets Dropped by TCP/UDP Simulate to Find the Number of Packets Dropped due to Congestion Simulate to Compare Data Rate& Throughput	3 + 3	10-10-2025 17-10-2025		**TLM8/TLM5**	
13.	**Lab-Internal-**	3	24-10-2025			

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	30-06-2025		
I Phase of Instructions	30-06-2025	23-08-2025	8W
I Mid Examinations	25-08-2025	30-08-2025	1W
II Phase of Instructions	01-09-2025	01-11-2025	9W
II Mid Examinations	03-11-2025	08-11-2025	1W
Preparation and Practical's	10-11-2025	15-11-2025	1W
Semester End Examinations	17-11-2025	29-11-2025	2W

EVALUATION PROCESS:

Evaluation Task	Marks
Day to Day Work	15
Internal Lab Exam	15
Continuous Internal Assessment (CIA)	30
Procedure	20
Execution & Results	30
Viva Voice	**20**
Semester End Examinations	**70**
Total Marks: CIE + SEE	**100**

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**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
PO 7	**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.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
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PO 12	**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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
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Rajasekhar Kommaraju	**Dr.B. Siva Rama Krishna**	**Mr.G.Rajendra**	**Dr.D. Ratna Kishore**
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

Part-A

Program	:	**B.Tech.(It), V-Semester,Sec-A**
Academic Year	:	**2025-2026**
Course Name & CODE	:	**Python With Django -(23ITS1)**
L-T-P Structure	:	**0 0 3**
Course Credits	:	**2**
Course Instructor	:	**Dr.K.Venugopal**
Pre-Requisites	:	**Python , HTML,CSS, JS**

Course Objectives:

- Design and build static as well as dynamic web pages and interactive web-based applications
- Web development using Django framework.
- Analyze and create functional website in Django and deploy Django Web Application on Cloud

COURSE OUTCOMES (COs):

CO 1	Apply Python libraries and web frameworks to design and develop dynamic and interactive web applications. **.(Apply - L3)**
CO 2	Develop and integrate Django-based modules to implement user authentication, database operations, and UI components. **.(Apply - L3)**
CO 3	Deploy functional Django web applications to cloud platforms by applying standard deployment practices and tools**. .(Apply - L3)**
CO 4	Improve individual / teamwork skills, communication & report writing skills with ethical values. **(Apply-L3)**

Course Articulation Matrix (Correlation between COs& POs, PSOs):

COs	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	PSO 3
CO1	3	1	1	-	2	-	-	-	-	-	-	-	-	-	3
CO2	2	2	2	-	2	-	-	-	-	-	-	-	-	3	3
CO3	2	-	2		3	-	-	-	-	-	3	3	-	-	3
CO4	-	-	-	-	-	-	-	3	3	3	-	-	-	-	1

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2** –Moderate (Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

1. Martin Brown, "Python: The Complete Reference Paper back", 4th Edition 2018, McGraw Hill Education.
2. Reema Thareja, "Python Programming: Using Problem Solving Approach", 3rd Edition 2017, Oxford.
3. Daniel Rubio, Apress, "Beginning Django Web Application Development and Deployment with Python", 2nd Edition 2017,Apress.

BOS APPROVED REFERENCE BOOKS:

1. Tom Aratyn, "Building Django 2.0 Web Applications: Create enterprise-grade, scalable Python web applications easily with Django 2.0",2ndEdition 2018, Packt Pub
2. Harry Percival, "Test-Driven Development with Python: Obey the Testing Goat: Using Django, Selenium and JavaScript",2nd Edition 2019, Kindle Edition.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion SEC_A	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Unit-I Collections-Container data types,Tkinter-GUI , applications , Requests-HTTP requests, Sample Programs,	3	30-06-2025		TLM2	CO1	
2.	BeautifulSoup4-web scraping, Scrapy, Zappa, Dash, CherryPy, Turbo Gears, Sample Programs,	3	14-07-2025		TLM3	CO1	
3.	Flask, Web2Py, Bottle, Falcon, Cubic Web, Quixote, Pyramid. , Sample Programs,	3	21-07-2025		TLM4	CO1	
4.	Unit-II Understanding Django environment, Features of Django and Django architecture, MVC and MTV, Urls and Views, Mapping the views to URLs, , Sample Programs,	3	28-07-2025		TLM2	CO1	
5.	Django Template, Template inheritance Django Models, Creating model for site, , Sample Programs,	3	04-08-2025		TLM3	CO1	
6.	Converting the model into a table, Fields in Models, Integrating Bootstrap into Django, Creating tables, Creating grids, Creating carousels. , Sample Programs,	3	11-08-2025		TLM4	CO1	
7.	Unit-III Introduction to Django Authentication System, Security Problem &Solution with Django Creating Registration Form using Django, , Sample Programs,	3	18-08-2025		TLM2	CO2	
8.	Adding Email Field in Forms, Configuring email settings, Sending emails with Django, Sample Programs,	3	01-09-2025		TLM3	CO2	
9.	Adding Grid Layout On Registration Page, Adding Page Restrictions, Login Functionality Test and Logout, Sample Programs,	3	08-09-2025		TLM4	CO2	
10.	Unit-IV DatabaseMigrations, Fetch Data From Database, Displaying Data OnTemplates, Adding Condition On Data, Sending data from url to view , Sample Programs,	3	15-09-2025		TLM2	CO2	

11.	Sending data from view to template, Saving objects into database, Sorting objects, , Sample Programs,	3	22-09-2025		TLM3	CO2	
12.	Filtering objects, Deleting objects, Difference between session and cookie, Creating sessions and cookies in Django, Sample Programs,	3	29-09-2025		TLM4	CO2	
13.	Unit-V Creating a functional website in Django, Four Important Pillars to Deploy, registering on Heroku and GitHub, , Sample Programs,	3	06-10-2025		TLM2	CO3	
14.	Push project from Local System to GitHub, working with Django Heroku,	3	13-10-2025		TLM3	CO3	
15.	Working with StaticRoot, Handling WSGI with gunicorn, setting up Database & adding users	3	20-10-2025		TLM4	CO3	
16.	**Programs Beyond Syllabus, Revision, Pending Etc/ Mini project**	3	20-10-2025		TLM6	CO3	
17.	**Lab Internal Examination**	3	27-10-2025				

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions..
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	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Signature				
Name of the Faculty	**Dr.K.VenuGopal**	**Dr.K.VenuGopal**	**Dr. K.Phaneendra**	**Dr.D.RatnaKishore**

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

Part-A

Program	:	**B.Tech.(It), V-Semester,Sec-B**
Academic Year	:	**2025-2026**
Course Name & CODE	:	**Python With Django -(23ITS1)**
L-T-P Structure	:	**0 0 3**
Course Credits	:	**2**
Course Instructor	:	**Dr.K.Venugopal**
Pre-Requisites	:	**Python , HTML,CSS, JS**

Course Objectives:

- Design and build static as well as dynamic web pages and interactive web-based applications
- Web development using Django framework.
- Analyze and create functional website in Django and deploy Django Web Application on Cloud

COURSE OUTCOMES (COs):

CO 1	Apply Python libraries and web frameworks to design and develop dynamic and interactive web applications. **.(Apply - L3)**
CO 2	Develop and integrate Django-based modules to implement user authentication, database operations, and UI components. **.(Apply - L3)**
CO 3	Deploy functional Django web applications to cloud platforms by applying standard deployment practices and tools**. .(Apply - L3)**
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CO2	2	2	2	-	2	-	-	-	-	-	-	-	-	3	3
CO3	2	-	2		3	-	-	-	-	-	3	3	-	-	3
CO4	-	-	-	-	-	-	-	3	3	3	-	-	-	-	1

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2. Harry Percival, "Test-Driven Development with Python: Obey the Testing Goat: Using Django, Selenium and JavaScript",2nd Edition 2019, Kindle Edition.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion SEC_B	Teaching Learning Methods	Learning Outcome COs	HOD Sign Weekly
1.	Unit-I Collections-Container data types,Tkinter-GUI , applications , Requests-HTTP requests, Sample Programs,	3	01-07-2025		TLM2	CO1	
2.	BeautifulSoup4-web scraping, Scrapy, Zappa, Dash, CherryPy, Turbo Gears, Sample Programs,	3	15-07-2025		TLM3	CO1	
3.	Flask, Web2Py, Bottle, Falcon, Cubic Web, Quixote, Pyramid. , Sample Programs,	3	22-07-2025		TLM4	CO1	
4.	Unit-II Understanding Django environment, Features of Django and Django architecture, MVC and MTV, Urls and Views, Mapping the views to URLs, , Sample Programs,	3	29-07-2025		TLM2	CO1	
5.	Django Template, Template inheritance Django Models, Creating model for site, , Sample Programs,	3	05-08-2025		TLM3	CO1	
6.	Converting the model into a table, Fields in Models, Integrating Bootstrap into Django, Creating tables, Creating grids, Creating carousels. , Sample Programs,	3	12-08-2025		TLM4	CO1	
7.	Unit-III Introduction to Django Authentication System, Security Problem &Solution with Django Creating Registration Form using Django, , Sample Programs,	3	19-08-2025		TLM2	CO2	
8.	Adding Email Field in Forms, Configuring email settings, Sending emails with Django, Sample Programs,	3	02-09-2025		TLM3	CO2	
9.	Adding Grid Layout On Registration Page, Adding Page Restrictions, Login Functionality Test and Logout, Sample Programs,	3	09-09-2025		TLM4	CO2	
10.	Unit-IV DatabaseMigrations, Fetch Data From Database, Displaying Data OnTemplates, Adding Condition On Data, Sending data from url to view , Sample Programs,	3	16-09-2025		TLM2	CO2	

11.	Sending data from view to template, Saving objects into database, Sorting objects, , Sample Programs,	3	23-09-2025		TLM3	CO2	
12.	Filtering objects, Deleting objects, Difference between session and cookie, Creating sessions and cookies in Django, Sample Programs,	3	30-09-2025		TLM4	CO2	
13.	Unit-V Creating a functional website in Django, Four Important Pillars to Deploy, registering on Heroku and GitHub, , Sample Programs,	3	07-10-2025		TLM2	CO3	
14.	Push project from Local System to GitHub, working with Django Heroku,	3	14-10-2025		TLM3	CO3	
15.	Working with StaticRoot, Handling WSGI with gunicorn, setting up Database & adding users	3	21-10-2025		TLM4	CO3	
16.	**Programs Beyond Syllabus, Revision, Pending Etc/ Mini project**	3	21-10-2025		TLM6	CO3	
17.	**Lab Internal Examination**	3	28-10-2025				

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	**Marks**
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PROGRAMME OUTCOMES (POs):

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PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions..
PSO 2	Design, Implement and evaluate a computer-based system to meet desired needs.
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	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Signature				
Name of the Faculty	**Dr.K.VenuGopal**	**Dr.K.VenuGopal**	**Dr. K.Phaneendra**	**Dr.D.RatnaKishore**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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http://lbrce.ac.in/it/index.php, hodit@lbrce.ac.in , Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: D. VIJAYASRI
Course Name & Code : **USER INTERFACE DESIGN USING FLUTTER & 23IT53**
L-T-P Structure : **0-0-2** **Credits:** 1
Program/Sem/Sec : B.Tech/IT/V/A **A.Y.:** 2025-26

Course Objectives:

- Learns to Implement Flutter Widgets and Layouts
- Understands Responsive UI Design and with Navigation in Flutter
- Knowledge on Widges and customize widgets for specific UI elements, Themes
- Understand to include animation apart from fetching data

Course Educational Objectives (CEOs):

- Introduce core programming concepts of Python programming language.
- Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
- Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications.

Course Outcomes:

At the end of this course, the student will be able to

CO1: Apply Flutter and Dart fundamentals to design and develop interactive user interfaces. (Apply-L3)

CO2: Implement UI layouts, navigation, state management, and responsive design principles for mobile applications. (Apply-L3)

CO3: Integrate animations, API data fetching, form validation, and debugging techniques to enhance application performance and usability. (Apply-L3)

CO4: Improve individual / teamwork skills, communication & report writing skills with ethical Value

COURSE ARTICULATION MATRIX (Correlation between Cos, Pos & PSOs):

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	2	3								1	3	3
CO2	3	3	3	3	3								1	3	3
CO3	3	3	3	3	3								2	3	3
CO4			1										2	2	2

Note: 1- Slight (Low), **2 -** Moderate (Medium), **3 -** Substantial (High)

PART-B:

COURSE DELIVERY PLAN (LESSON PLAN):

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	HOD Sign
1.	a) Install Flutter and Dart SDK b) Write a simple Dart program to understand the language basics.	02	03-07-2025		
2	a) Explore various Flutter widgets (Text, Image, Container, etc.). b) Implement different layout structures using Row, Column, and Stack widgets	02	10-07-2025 17-07-2025		
3	a) Design a responsive UI that adapts to different screen sizes b) Implement media queries and breakpoints for responsiveness	02	24-07-2025		
4	a) Set up navigation between different screens using Navigator. b) Implement navigation with named routes.	02	31-07-2025		
5	a) Learn about stateful and stateless widgets. b) Implement state management using set State and Provider	02	07-08-2025		
6	a) Create custom widgets for specifie UI elements. b) Apply styling using themes and custom style	02	14-08-2025 21-08-2025		
7	a) Design a form with various input fields. b) Implement form validation and error handling.	02	4-09-2025 11-09-2025		
8	a) Add animations to Ul elements using Flutter's animation framework. b) Experiment with different types of animations (fade, slide, etc.).	02	18-09-2025 25-09-2025		
9	a) Fetch data from a REST API b) Display the fetched data in a meaningful way in the UL.	02	9-10-2025		
10	a) Write unit tests for Ul components. b) Use Flutter's debugging tools to identify and fix issues.	02	16-10-2025 23-10-2025		
11	INTERNAL LAB EXAM	02	30-10-2025		

PART-C

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Day to Day Work:	15
Internal Test	15
Continuous Internal Assessment	30
Procedure	20
Execution & Results	30
Viva-voce	20
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**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.
PO 3	**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.
PO 4	**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.
PO 5	**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.
PO 6	**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.
PO 7	**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.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**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.
PO 11	**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.
PO 12	**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

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Organize, Analyze and Interpret the data to extract meaningful conclusions.
PSO 2	Design, Implement and Evaluate a computer-based system to meet desired needs.
PSO 3	Develop IT application services with the help of different current engineering tools.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty				
Signature				

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA (Under Tier - I)
An ISO 21001:2018,14001:2015,50001:2018 Certified Institution
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.
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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor: D. VIJAYASRI
Course Name & Code : **USER INTERFACE DESIGN USING FLUTTER & 23IT53**
L-T-P Structure : **0-0-2** **Credits:** 1
Program/Sem/Sec : B.Tech/IT/V/B **A.Y.:** 2025-26

Course Objectives:

- Learns to Implement Flutter Widgets and Layouts
- Understands Responsive UI Design and with Navigation in Flutter
- Knowledge on Widges and customize widgets for specific UI elements, Themes
- Understand to include animation apart from fetching data

Course Educational Objectives (CEOs):

- Introduce core programming concepts of Python programming language.
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- Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications.

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3	a) Design a responsive UI that adapts to different screen sizes b) Implement media queries and breakpoints for responsiveness	02	21-07-2025		
4	a) Set up navigation between different screens using Navigator. b) Implement navigation with named routes.	02	28-07-2025		
5	a) Learn about stateful and stateless widgets. b) Implement state management using set State and Provider	02	04-08-2025 11-08-2025		
6	a) Create custom widgets for specifie UI elements. b) Apply styling using themes and custom style	02	18-08-2025 25-08-2025		
7	a) Design a form with various input fields. b) Implement form validation and error handling.	02	1-09-2025 8-09-2025		
8	a) Add animations to Ul elements using Flutter's animation framework. b) Experiment with different types of animations (fade, slide, etc.).	02	15-09-2025 22-09-2025		
9	a) Fetch data from a REST API b) Display the fetched data in a meaningful way in the UL.	02	29-09-2025 6-10-2025		
10	a) Write unit tests for Ul components. b) Use Flutter's debugging tools to identify and fix issues.	02	13-10-2025 20-10-2025		
11	INTERNAL LAB EXAM	02	27-10-2025		

PART-C

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Continuous Internal Assessment	30
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