



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)

Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada

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

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : K. Lavanya
Course Name & Code : CLOUD COMPUTING & 17CI29
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., IT., VII-Sem., Sec-A A.Y : 2022-23

PRE-REQUISITE: Knowledge in basics of Operating System & Computer Networks.

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course provides the knowledge on understanding modern technologies, tools and systems in the field of cloud computing, analyze complex engineering problems and relevance to the society and industry. And finally they can have good skills in cloud application development and maintenance.

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

CO 1	L1	Understand various delivery and deployment models.
CO 2	L2	Analyze the virtual machine provisioning and virtualized storage strategies.
CO 3	L2	Explore the PAAS and SAAS Services.
CO 4	L1	Identify the issues in monitoring and management in cloud environment for achieving Quality of Service (QOS).
CO 5	L1	Identify the components necessary for deployment of applications on the cloud.

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	-	-	-	-	-	-	-	-	1	3	1	2
CO2	3	1	1	-	-	-	-	-	-	-	-	1	3	1	2
CO3	2	-	1	-	-	-	-	-	-	-	-	1	2	1	3
CO4	2	-	1	-	-	-	-	-	-	-	-	1	2	1	3
CO4	2	1	2	-	1	1	-	-	-	-	-	1	2	1	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 “Cloud Computing: Principles and paradigms”, Rajkumar Buyya, James Broberg, Andrzej Goseinski, Wiley, New York, USA.
- T2 Michael Miller, Cloud Computing-Web Based Application That Change the way you work and Collaborate Online, Pearson Education.

REFERENCE BOOKS:

- R1** George Reese, Cloud Application Architectures, O'Reilly Media, 1st Edition.
R2 David S. Linthicum, Cloud Computing and SOA Convergence in Your Enterprise: A Step-by- Step Guide, Addison-Wesley Professional.

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: FOUNDATIONS**

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 Outcomes and Introduction : Foundations: Introduction to Cloud Computing	1	2/08/22		TLM2	
2.	Foundations: Introduction to Cloud Computing	1	3/08/22		TLM2	
3.	Foundations: Introduction to Cloud Computing	1	4/08/22		TLM2	
4.	Migrating Cloud	1	5/08/22		TLM2	
5.	Migrating Cloud	1	6/08/22		TLM2	
6.	Enriching the Integration as a Service	1	10/08/22		TLM2	
7.	Enriching the Integration as a Service	1	11/08/22		TLM2	
8.	Cloud Computing for Enterprise Application	1	12/08/22		TLM2	
9.	Revision On Unit-1& Assignment-I	1	16/08/22		TLM2	
No. of classes required to complete UNIT-I: 9				No. of classes taken:		

UNIT-II: INFRASTRUCTURE AS A SERVICE

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.	VM provisioning manageability services	1	17/08/22		TLM2	
2.	VM provisioning manageability services	1	18/08/22		TLM2	
3.	On the management of virtual machines for cloud infrastructures	1	20/08/22		TLM2	
4.	On the management of virtual machines for cloud infrastructures	1	23/08/22		TLM2	
5.	On the management of virtual machines for cloud infrastructures	1	24/08/22		TLM2	
6.	On the management of virtual machines for cloud infrastructures	1	25/08/22		TLM2	

7.	Enhancing cloud computing environments using cluster as a service		26/08/22		TLM2	
8.	Enhancing cloud computing environments using cluster as a service		27/08/22		TLM2	
9.	Enhancing cloud computing environments using cluster as a service		29/08/22		TLM2	
10.	Revision of UNIT-2 & Assignment-II		30/08/22		TLM2	
No. of classes required to complete UNIT-II:10				No. of classes taken:		

(19-09-2022 TO 24-09-2022) I-mid exams

UNIT-III: PLATFORM AND SOFTWARE AS A SERVICE

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.	Aneka - integration of private and public cloud	1	01/09/22		TLM2	
2.	Aneka - integration of private and publicCloud	1	02/09/22		TLM2	
3.	Aneka - integration of privateand public cloud	1	27/09/22		TLM2	
4.	Comet Cloud :An Automatic Cloud Engine	1	28/09/22		TLM2	
5.	Comet Cloud : An Automatic Cloud Engine	1	29/09/22		TLM2	
6.	Comet Cloud :An Automatic Cloud Engine	1	30/09/22		TLM2	
7.	Comet Cloud :An Automatic Cloud Engine	1	01/10/22		TLM2	
8.	T-Systems cloud-based Solutions for Business Applications	1	11/10/22		TLM2	
9.	T-Systems cloud-based Solutions for Business Applications	1	12/10/22		TLM2	
10.	T-Systems cloud-based Solutions for Business Applications	1	13/10/22		TLM2	
11.	T-Systems cloud-based Solutions for Business Applications	1	14/10/22		TLM2	
12.	Revision of UNIT-3 & Assignment-III	1	15/10/22		TLM2	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV: SOFTWARE AS A SERVICE (SAAS)

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.	Workflow Engine for Clouds	1	18/10/22		TLM2	
2.	Workflow Engine for Clouds	1	19/10/22		TLM2	

3.	Workflow Engine for Clouds	1	20/10/22		TLM2	
4.	Workflow Engine for Clouds	1	21/10/22		TLM2	
5.	Understanding Scientific applications for cloud environment	1	22/10/22		TLM2	
6.	Understanding Scientific applications for cloud environment	1	25/10/22		TLM2	
7.	Understanding Scientific applications for cloud environment	1	26/10/22		TLM2	
8.	Understanding Scientific applications for cloud environment	1	27/10/22		TLM2	
9.	The Map reduce programming model and implementations	1	28/10/22		TLM2	
10.	The Map reduce programming model and implementations	1	29/10/22		TLM2	
11.	The Map reduce programming model and implementations	1	1/11/22		TLM2	
12.	Revision of UNIT-4	1	2/11/22		TLM2	
13.	Assignment-IV	1	3/11/22		TLM2	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V: MONITORING AND MANAGEMENT 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.	An architecture for Federal Cloud computing	1	4/11/22		TLM2	
2.	An architecture for Federal Cloud computing	1	5/11/22		TLM2	
3.	SLA Management inCC: a service provider's perspective	1	8/11/22		TLM2	
4.	SLA Management inCC: a service provider's perspective	1	11/11/22		TLM2	
5.	Performance prediction for HPC on clouds	1	12/11/22		TLM2	
6.	Performance prediction for HPC on clouds	1	15/11/22		TLM2	
7.	Architecting Cloud Applications for the Amazon Cloud	1	16/11/22		TLM2	
8.	Revision of UNIT-5 & Assignment-V	1	16/11/22		TLM2	
No. of classes required to complete UNIT-V: 8				No. of classes taken:		

Content Beyond Syllabus					
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1.	Amazon Foundation Course	1	17/11/22		TLM2
2.	Amazon Foundation Course	1	18/11/22		TLM2
3.	Amazon Foundation Course	1	19/11/22		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	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.

Course Instructor

(Dr. K. Lavanya)

Module Coordinator

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HOD

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CO 3	L2	Explore the PAAS and SAAS Services.
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CO2	3	1	1	-	-	-	-	-	-	-	-	1	3	1	2
CO3	2	-	1	-	-	-	-	-	-	-	-	1	2	1	3
CO4	2	-	1	-	-	-	-	-	-	-	-	1	2	1	3
CO4	2	1	2	-	1	1	-	-	-	-	-	1	2	1	3

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2.	Foundations: Introduction to Cloud Computing	1	3/08/22		TLM2	
3.	Foundations: Introduction to Cloud Computing	1	4/08/22		TLM2	
4.	Migrating Cloud	1	6/08/22		TLM2	
5.	Migrating Cloud	1	8/08/22		TLM2	
6.	Enriching the Integration as a Service	1	10/08/22		TLM2	
7.	Enriching the Integration as a Service	1	11/08/22		TLM2	
8.	Cloud Computing for Enterprise Application	1	16/08/22		TLM2	
9.	Revision On Unit-1& Assignment-I	1	17/08/22		TLM2	
No. of classes required to complete UNIT-I: 9				No. of classes taken:		

UNIT-II: INFRASTRUCTURE AS A SERVICE

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.	VM provisioning manageability services	1	18/08/22		TLM2	
2.	VM provisioning manageability services	1	20/08/22		TLM2	
3.	On the management of virtual machines for cloud infrastructures	1	22/08/22		TLM2	
4.	On the management of virtual machines for cloud infrastructures	1	23/08/22		TLM2	
5.	On the management of virtual machines for cloud infrastructures	1	24/08/22		TLM2	
6.	Enhancing cloud computing environments using cluster as a service		25/08/22		TLM2	

7.	Enhancing cloud computing environments using cluster as a service		27/08/22		TLM2	
8.	Enhancing cloud computing environments using cluster as a service		29/08/22		TLM2	
9.	Revision of UNIT-2 & Assignment-II		30/08/22		TLM2	
No. of classes required to complete UNIT-II:10				No. of classes taken:		

(19-09-2022 TO 24-09-2022) I-mid exams

UNIT-III: PLATFORM AND SOFTWARE AS A SERVICE

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.	Aneka - integration of private and public cloud	1	01/09/22		TLM2	
2.	Aneka - integration of private and publicCloud	1	03/09/22		TLM2	
3.	Aneka - integration of privateand public cloud	1	26/09/22		TLM2	
4.	Comet Cloud :An Automatic Cloud Engine	1	27/09/22		TLM2	
5.	Comet Cloud : An Automatic Cloud Engine	1	28/09/22		TLM2	
6.	Comet Cloud :An Automatic Cloud Engine	1	29/09/22		TLM2	
7.	Comet Cloud :An Automatic Cloud Engine	1	01/10/22		TLM2	
8.	T-Systems cloud-based Solutions for Business Applications	1	10/10/22		TLM2	
9.	T-Systems cloud-based Solutions for Business Applications	1	11/10/22		TLM2	
10.	T-Systems cloud-based Solutions for Business Applications	1	12/10/22		TLM2	
11.	T-Systems cloud-based Solutions for Business Applications	1	13/10/22		TLM2	
12.	Revision of UNIT-3 & Assignment-III	1	15/10/22		TLM2	
No. of classes required to complete UNIT-III: 12				No. of classes taken:		

UNIT-IV: SOFTWARE AS A SERVICE (SAAS)

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.	Workflow Engine for Clouds	1	17/10/22		TLM2	
2.	Workflow Engine for Clouds	1	18/10/22		TLM2	
3.	Workflow Engine for Clouds	1	19/10/22		TLM2	

4.	Workflow Engine for Clouds	1	20/10/22		TLM2	
5.	Understanding Scientific applications for cloud environment	1	22/10/22		TLM2	
6.	Understanding Scientific applications for cloud environment	1	24/10/22		TLM2	
7.	Understanding Scientific applications for cloud environment	1	25/10/22		TLM2	
8.	Understanding Scientific applications for cloud environment	1	26/10/22		TLM2	
9.	The Map reduce programming model and implementations	1	27/10/22		TLM2	
10.	The Map reduce programming model and implementations	1	29/10/22		TLM2	
11.	The Map reduce programming model and implementations	1	31/10/22		TLM2	
12.	Revision of UNIT-4	1	1/11/22		TLM2	
13.	Assignment-IV	1	2/11/22		TLM2	
No. of classes required to complete UNIT-IV: 13				No. of classes taken:		

UNIT-V: MONITORING AND MANAGEMENT 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.	An architecture for Federal Cloud computing	1	3/11/22		TLM2	
2.	An architecture for Federal Cloud computing	1	5/11/22		TLM2	
3.	SLA Management inCC: a service provider's perspective	1	7/11/22		TLM2	
4.	SLA Management inCC: a service provider's perspective	1	8/11/22		TLM2	
5.	Performance prediction for HPC on clouds	1	10/11/22		TLM2	
6.	Performance prediction for HPC on clouds	1	11/11/22		TLM2	
7.	Architecting Cloud Applications for the Amazon Cloud	1	12/11/22		TLM2	
8.	Architecting Cloud Applications for the Amazon Cloud	1	13/11/22		TLM2	
9.	Revision of UNIT-5 & Assignment-V	1	15/11/22		TLM2	
No. of classes required to complete UNIT-V: 8				No. of classes taken:		

Content Beyond Syllabus					
S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods
1.	Amazon Foundation Course	1	17/11/22		TLM2
2.	Amazon Foundation Course	1	18/11/22		TLM2
3.	Amazon Foundation Course	1	19/11/22		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.
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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.
PSO 3	Develop IT application services with the help of different current engineering tools.

Course Instructor

(Dr. K. Lavanya)

Module Coordinator

(Dr. K. Lavanya)

HOD

(Dr.B,Srinivasa Rao)



COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. G. Rajendra
Course Name & Code : Design Patterns & 17IT12 **Credits:** 3
L-T-P Structure : 3-0-0
Program/Sem/Sec : B.Tech., IT., VII-Sem., A-Section **A.Y:** 2022-23

Pre-requisite: Software Engineering, Object Oriented Programming basics

Course Educational Objectives (CEOs):

This course introduces how to design application with different design patterns. Students will be imparted with the skills for creating and maintain applications, to gain a breadth of knowledge for developing applications.

COURSE OUTCOMES (CO):

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

CO1	Identify the design patterns to solve object-oriented design problems.
CO2	Analyze & Combine Design Patterns to work together in software design process.
CO3	Construct Software Systems & Components using Design Pattern (Catalog's).
CO4	Implement Creational Patterns (Singleton, Factory, and Abstract Factory) & Structural Patterns for given Applications.
CO5	Evaluate Design Solutions by using Behavioral Patterns.

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	2	1	2	-	-	-	-	-	-	-	-	1	3	1	1
CO2	1	2	2	-	-	-	-	-	-	-	-	1	3	1	2
CO3	2	1	2	-	-	-	-	-	-	-	-	1	2	3	3
CO4	-	2	2	-	-	-	-	-	-	-	-	1	2	3	3
CO5	-	1	2	-	-	-	-	-	-	-	-	1	1	3	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).

BOS APPROVED TEXT BOOKS:

- 1 Erich Gamma, "Design Patterns", Pearson Education.
- 2 Eric Freeman, "Head First Design patterns", Oreilly-SPD.

BOS APPROVED REFERENCE BOOKS:

- 1 Mark Grand, "Pattern's in JAVA Vol-I", Wiley DreamTech.
- 2 Alan Aalloway, "Design patterns Explained", Pearson Education.

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 to course: Course outcomes and program outcomes	1	01-08-2022		TLM2	
2.	What is Design pattern? Design patterns in Smalltalk MVC	1	02-08-2022		TLM2	
3.	Describing Design patterns	1	03-08-2022		TLM2	
4.	The catalog of Design patterns	1	04-08-2022		TLM2	
5.	Tutorial-1	1	05-08-2022		TLM3	
6.	Organizing the catalog	1	08-08-2022		TLM2	
7.	How design patterns solve design problems	1	10-08-2022		TLM2	
8.	Tutorial-2	1	11-08-2022		TLM3	
9.	Assignment/Quiz-1	1	12-08-2022		TLM6	
No. of classes required to complete UNIT-I		9	No. of classes taken:			

UNIT-II: A Case study

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.	Designing a document editor-Design problem	1	16-08-2022		TLM2	
11.	Document structure, Formatting,	1	17-08-2022		TLM2, TLM9	
12.	Embellishing the user interface,	1	18-08-2022		TLM2	
13.	Supporting Multiple look-and-feel standards Tutorial-3	1	22-08-2022		TLM2 TLM3	
14.	User operations spelling checking	1	23-08-2022		TLM2	
15.	Hyphenation summary	1	24-08-2022		TLM2	
16.	Tutorial-4	1	25-08-2022		TLM3 TLM6	
17.	Assignment/Quiz-2	1	26-08-2022		TLM3 TLM6	
No. of classes required to complete UNIT-II		08	No. of classes taken:			

(19-09-2022 TO 24-09-2022) I-mid exams**UNIT-III: Creational Patterns, Structural pattern part –I and Structural pattern part –II**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Creational Patterns: Abstract factory, Builder	1	01-09-2022		TLM2	
19.	Factory method, Prototype	1	02-09-2022		TLM2	
20.	singleton, Discussion on creational patterns,		26-09-2022		TLM2, TLM9	
21.	Tutorial-5	1	27-09-2022		TLM3	
22.	Structural pattern part –I: Adapter	1	28-09-2022		TLM2, TLM9	
23.	Bridge, Composite	1	29-09-2022		TLM2	
24.	Structural pattern part –II: Decorator	1	30-09-2022		TLM6	
25.	Façade,	1	10-10-2022		TLM2	
26.	Flyweight, Proxy	1	11-10-2022		TLM2	
27.	Tutorial-6	1	12-10-2022		TLM3	
28.	Assignment/Quiz-3	1	13-10-2022		TLM3 TLM6	
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV: Behavioral pattern part –I and Behavioral pattern part –II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Introduction to Behavioral Patterns	1	14-10-2022		TLM2	
30.	Behavioral pattern part –I: Chain of responsibility, Command	1	17-10-2022		TLM2	
31.	Behavioral pattern part I: Interpreter, Iterator.	1	18-10-2022		TLM2	
32.	Tutorial -7 Behavioral pattern part –II: Mediator,	1	19-10-2022		TLM3 TLM2	
33.	Observer	1	20-10-2022		TLM2	
34.	Behavioral pattern part –II: State,	1	21-10-2022		TLM2	
35.	Strategy	1	25-10-2022		TLM2	
36.	Behavioral pattern part –II: Template Method,	1	27-10-2022		TLM2	
37.	Visitor	1	28-10-2022		TLM2	
38.	Discussion of Behavioral patterns	1	01-11-2022		TLM2	
39.	Tutorial -8	1	02-11-2022		TLM9 TLM3	
40.	Assignment/Quiz-4	1	03-11-2022		TLM6	
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V: Conclusion

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	What to expect from Design patterns, A brief history	1	04-11-2022		TLM2	
42.	What to expect from Design patterns,	1	07-11-2022		TLM2	
43.	A brief history	1	09-11-2022		TLM2	
44.	An invitation, A pattern thought.	1	10-11-2022		TLM3	
45.	Tutorial -10	1	11-11-2022		TLM2	
46.	The pattern community	1	14-11-2022		TLM3	
47.	Assignment/Quiz-5	1	15-11-2022		TLM6	
No. of classes required to complete UNIT-V		07	No. of classes taken:			

(21-11-2022 TO 26-11-2-22) II-MID EXAMINATIONS

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
48.	Design Patterns in Java	1	16-11-2022			
49.	Introduction to Object-Oriented Design Patterns	2	17-11-2022 & 18-11-2022			

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	11-07-2022		
I Phase of Instructions	11-07-2022	03-09-2022	8 W
CRT Classes	05-09-2022	17-09-2022	2W
I Mid Examinations	19-09-2022	24-09-2022	1W
II Phase of Instructions	26-09-2022	19-11-2022	8 W
II Mid Examinations	21-11-2022	26-11-2022	1W
Preparation and Practical	28-11-2022	03-12-2022	1W
Semester End Examinations	05-12-2022	17-12-2022	2W

EVALUATION PROCESS:

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	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.

Course Instructor	Module Coordinator	HOD
(Mr. G. Rajendra)		Dr. B. Srinivasa Rao



COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. G. Rajendra
Course Name & Code : Design Patterns & 17IT12 **Credits:** 3
L-T-P Structure : 3-0-0
Program/Sem/Sec : B.Tech., IT., VII-Sem., B-Section **A.Y:** 2022-23

Pre-requisite: Software Engineering, Object Oriented Programming basics

Course Educational Objectives (CEOs):

This course introduces how to design application with different design patterns. Students will be imparted with the skills for creating and maintain applications, to gain a breadth of knowledge for developing applications.

COURSE OUTCOMES (CO):

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

CO1	Identify the design patterns to solve object-oriented design problems.
CO2	Analyze & Combine Design Patterns to work together in software design process.
CO3	Construct Software Systems & Components using Design Pattern (Catalog's).
CO4	Implement Creational Patterns (Singleton, Factory, and Abstract Factory) & Structural Patterns for given Applications.
CO5	Evaluate Design Solutions by using Behavioral Patterns.

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	2	1	2	-	-	-	-	-	-	-	-	1	3	1	1
CO2	1	2	2	-	-	-	-	-	-	-	-	1	3	1	2
CO3	2	1	2	-	-	-	-	-	-	-	-	1	2	3	3
CO4	-	2	2	-	-	-	-	-	-	-	-	1	2	3	3
CO5	-	1	2	-	-	-	-	-	-	-	-	1	1	3	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).

BOS APPROVED TEXT BOOKS:

- 1 Erich Gamma, "Design Patterns", Pearson Education.
- 2 Eric Freeman, "Head First Design patterns", Oreilly-SPD.

BOS APPROVED REFERENCE BOOKS:

- 1 Mark Grand, "Pattern's in JAVA Vol-I", Wiley DreamTech.
- 2 Alan Aalloway, "Design patterns Explained", Pearson Education.

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 to course: Course outcomes and program outcomes	1	01-08-2022		TLM2	
2.	What is Design pattern? Design patterns in Smalltalk MVC	1	02-08-2022		TLM2	
3.	Describing Design patterns	1	04-08-2022		TLM2	
4.	The catalog of Design patterns	1	05-08-2022		TLM2	
5.	Tutorial-1	1	06-08-2022		TLM3	
6.	Organizing the catalog	1	08-08-2022		TLM2	
7.	How design patterns solve design problems	1	11-08-2022		TLM2	
8.	Tutorial-2	1	12-08-2022		TLM3	
9.	Assignment/Quiz-1	1	13-08-2022		TLM6	
No. of classes required to complete UNIT-I		9	No. of classes taken:			

UNIT-II: A Case study

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.	Designing a document editor-Design problem	1	16-08-2022		TLM2	
11.	Document structure, Formatting,	1	18-08-2022		TLM2, TLM9	
12.	Embellishing the user interface,	1	20-08-2022		TLM2	
13.	Supporting Multiple look-and-feel standards Tutorial-3	1	22-08-2022		TLM2 TLM3	
14.	User operations spelling checking	1	23-08-2022		TLM2	
15.	Hyphenation summary	1	25-08-2022		TLM2	
16.	Tutorial-4	1	26-08-2022		TLM3 TLM6	
17.	Assignment/Quiz-2	1	27-08-2022		TLM3 TLM6	
No. of classes required to complete UNIT-II		08	No. of classes taken:			

(19-09-2022 TO 24-09-2022) I-mid exams**UNIT-III: Creational Patterns, Structural pattern part –I and Structural pattern part –II**

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
18.	Creational Patterns: Abstract factory, Builder	1	01-09-2022		TLM2	
19.	Factory method, Prototype	1	02-09-2022		TLM2	
20.	singleton, Discussion on creational patterns,		03-09-2022		TLM2, TLM9	
21.	Tutorial-5	1	26-09-2022		TLM3	
22.	Structural pattern part –I: Adapter	1	27-09-2022		TLM2, TLM9	
23.	Bridge, Composite	1	29-09-2022		TLM2	
24.	Structural pattern part –II: Decorator	1	30-09-2022		TLM6	
25.	Façade,	1	10-10-2022		TLM2	
26.	Flyweight, Proxy	1	11-10-2022		TLM2	
27.	Tutorial-6	1	13-10-2022		TLM3	
28.	Assignment/Quiz-3	1	14-10-2022		TLM3 TLM6	
No. of classes required to complete UNIT-III		11	No. of classes taken:			

UNIT-IV: Behavioral pattern part –I and Behavioral pattern part –II

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29.	Introduction to Behavioral Patterns	1	15-10-2022		TLM2	
30.	Behavioral pattern part –I: Chain of responsibility, Command	1	17-10-2022		TLM2	
31.	Behavioral pattern part I: Interpreter, Iterator.	1	18-10-2022		TLM2	
32.	Tutorial -7 Behavioral pattern part –II: Mediator,	1	20-10-2022		TLM3 TLM2	
33.	Observer	1	21-10-2022		TLM2	
34.	Behavioral pattern part –II: State,	1	22-10-2022		TLM2	
35.	Strategy	1	25-10-2022		TLM2	
36.	Behavioral pattern part –II: Template Method,	1	27-10-2022		TLM2	
37.	Visitor	1	28-10-2022		TLM2	
38.	Discussion of Behavioral patterns	1	29-10-2022		TLM2	
39.	Tutorial -8	1	31-10-2022		TLM9 TLM3	
40.	Assignment/Quiz-4	1	01-11-2022		TLM6	
No. of classes required to complete UNIT-IV		12	No. of classes taken:			

UNIT-V: Conclusion

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
41.	What to expect from Design patterns, A brief history	1	03-11-2022		TLM2	
42.	What to expect from Design patterns,	1	04-11-2022		TLM2	
43.	A brief history	1	05-11-2022		TLM2	
44.	An invitation, A pattern thought.	1	07-11-2022		TLM3	
45.	Tutorial -10	1	10-11-2022		TLM2	
46.	The pattern community	1	11-11-2022		TLM3	
47.	Assignment/Quiz-5	1	12-11-2022		TLM6	
No. of classes required to complete UNIT-V		07	No. of classes taken:			

(21-11-2022 TO 26-11-2-22) II-MID EXAMINATIONS

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
48.	Design Patterns in Java	1	17-11-2022			
49.	Introduction to Object-Oriented Design Patterns	2	18-11-2022 & 19-11-2022			

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	11-07-2022		
I Phase of Instructions	11-07-2022	03-09-2022	8 W
CRT Classes	05-09-2022	17-09-2022	2W
I Mid Examinations	19-09-2022	24-09-2022	1W
II Phase of Instructions	26-09-2022	19-11-2022	8 W
II Mid Examinations	21-11-2022	26-11-2022	1W
Preparation and Practical	28-11-2022	03-12-2022	1W
Semester End Examinations	05-12-2022	17-12-2022	2W

EVALUATION PROCESS:

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	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.

Course Instructor	Module Coordinator	HOD
(Mr. G. Rajendra)		Dr. B. Srinivasa Rao



LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)

Accredited by NAAC with 'A' Grade & NBA (Under Tier - I), ISO 9001:2015 Certified Institution

Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada

L.B. REDDY NAGAR, MYLAVARAM, NTR DIST., A.P.-521 230

Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : PAVITRA RAMACHANDRAPURAM

Course Name&Code : BIG DATA ANALYTICS(17CI18)

L-T-PStructure :2-2-0

Credits:3

Program/Sem/Sec : B.Tech., IT, VII-Sem., Section– B

A.Y : 2022 -2023

PRE-REQUISITE: Knowledge of JAVA Programming Language

COURSE EDUCATIONAL OBJECTIVES (CEOs):

This course aims to provide students with the knowledge of current challenges, methodologies, and technologies in processing big data. Emphasis will be placed on the students understanding of the rationales behind the technologies and the student's ability to analyze big data using professional software packages like Hadoop and R.

COURSE OUTCOMES (COs):

At the end of the course, students are able to

CO1	Identify Big Data and its Business Implications.
CO2	Access and Process Data on Distributed File System.
CO3	Manage Job Execution in Hadoop Environment.
CO4	Develop Big Data Solutions using Hadoop Eco System.
CO5	Apply Machine Learning Techniques using R.

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	2	3	1	-	1	-	-	-	-	-	-	2	-	3	-
CO2	2	3	1	-	2	-	-	-	-	-	-	2	1	3	-
CO3	2	2	3	-	2	-	-	-	-	-	-	2	2	3	-
CO4	2	3	3	-	2	-	-	-	-	-	-	2	2	3	-
CO5	3	3	3	-	2	-	-	-	-	-	-	3	2	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** DataScienceandBigDataAnalytics–Discovering,Analyzing,Visualizingandpresenting data – EMC Education Services, EMC2, Wiley Publications, 2015.
- T2** TomWhite–Hadoop:TheDefinitiveGuide/ThirdEditon,O'reilyMedia,2012.
- T3** Seema Acharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015

REFERENCE BOOKS:

- R1** Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
- R2** Jay Liebowitz, "Big Data and Business Analytics", Auerbach Publications, CRC Press (2013).
- R3** Anand Rajaraman and Jeffrey David Ulman, "Mining of Massive Datasets", Cambridge University Press, 2012.
- R4** Arvind Sathi, "Big Data Analytics: Disruptive Technologies for Changing the Game", MC Press, 2012, 2001.

COURSE DELIVERY PLAN (LESSON PLAN) UNIT-I:**INTRODUCTION TO BIG DATA**

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.	Evolution of Big data, Best Practices for Big data Analytics	1	11-07-2022		TLM2	
2.	Big data characteristics, The Promotion of the Value of Big Data	1	12-07-2022		TLM2	
3.	Why Big Data, overview of Big Data, issues and challenges of Big Data	1	13-07-2022		TLM2	
4.	stages of analytical evolution, State of the Practice in Analytics	1	15-07-2022		TLM2	
5.	The Data Scientist	1	16-07-2022		TLM2	
6.	Big Data Analytics in Industry Verticals	1	18-07-2022		TLM2	
7.	Data Analytics Lifecycle	1	19-07-2022		TLM2	
8.	Data Analytics Lifecycle	1	20-07-2022		TLM2	
9.	Data Analytics Lifecycle	1	22-07-2022		TLM2	
10.	Basic Data Analytic Methods Using R	1	23-07-2022		TLM2	
11.	Basic Data Analytic Methods Using R	1	25-07-2022		TLM2	
12.	Big Data Use Cases- Characteristics of Big Data Applications	1	26-07-2022		TLM2	
13.	Big Data Use Cases- Characteristics of Big Data Applications	1	27-07-2022		TLM2	
14.	Assignment – 1	1	29-07-2022		TLM6	
No. of classes required to complete UNIT-I		14		No. of classes taken:		

UNIT-II: Technologies and Tools

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly	
15.	Analytics for Unstructured Data	1	30-07-2022		TLM2/ TLM4/ TLM5		
16.	MapReduce and Hadoop	1	01-08-2022		TLM2/ TLM4/ TLM5		
17.	The design of HDFS	1	02-08-2022		TLM2/ TLM4/ TLM5		
18.	HDFS concepts	1	03-08-2022		TLM2/ TLM4/ TLM5		
19.	Command line interface to HDFS	1	05-08-2022 06-08-2022		TLM2/ TLM4/		
20.	Hadoop File system Interfaces	1	08-08-2022		TLM5		
21.	Java Interface to Hadoop	1	10-08-2022 12-08-2022		TLM2/ TLM4/ TLM5		
22.	Anatomy of a file read, Anatomy of a file write	1	16-08-2022		TLM2/ TLM4/ TLM5		
23	Replica placement and Coherency Model	1	17-08-2022 20-08-2022		TLM2/ TLM4/ TLM5		
24	Parallel copying with distcp	1	23-08-2022				
25	keeping an HDFS cluster balanced	1	30-08-2022				
26	Advantages of Hadoop and HDFS	1	03-09-2022				
27	Big data Technological approaches and Potential use cases for Big Data Clustering, Regression	1	06-09-2022 16-09-2022				
28	Assignment - 2	1	17-09-2022				
No. of classes required to complete UNIT-II		14		No. of classes taken:			

UNIT-III: Anatomy of a Map Reduce Job Run

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29	Anatomy of a Map Reduce Job Run	1	26-09-2022 27-09-2022		TLM2/ TLM4/ TLM5	
30	Failures, Job Scheduling	1	28-09-2022 30-09-2022		TLM2/ TLM4/ TLM5	
31	Shuffle and Sort	1	10-10-2022 11-10-2022		TLM2/ TLM4/ TLM5	
32	Task Execution	1	12-10-2022		TLM2/ TLM4/ TLM5	
33	Map Reduce Types and Formats	1	14-10-2022		TLM2/ TLM4/ TLM5	
34	Map Reduce Features	1	15-10-2022		TLM2/ TLM4/ TLM5	

35	Map Reduce Features	1	17-10-2022		TLM2/ TLM4/ TLM5	
36	Assignment - 3	1	18-10-2022		TLM6	
No. of classes required to complete UNIT-III		08		No. of classes taken:		

UNIT-IV: HADOOP ECO-SYSTEM

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	Big Data Analytics - Demos, Hadoop and the Amazon Cloud	1	19-10-2022		TLM2/ TLM4/ TLM5	
38	Query languages for Hadoop, Spreadsheet-like analytics, Stream Computing	1	21-10-2022		TLM2/ TLM4/ TLM5	
39	Pig: Introduction to PIG, Execution Modes ofPig	1	22-10-2022		TLM2/ TLM4/ TLM5	
40	Comparison of Pig with Databases, Grunt, PigLatin.	1	26-10-2022		TLM2/ TLM4/ TLM5	
41	User Defined Functions, Data Processing operators	1	28-10-2022		TLM2/ TLM4/ TLM5	
42.	Hive: Hive Shell, Hive Services, HiveMetastore,Comparisonwith Traditional Databases,HiveQL, Tables	1	29-10-2022		TLM2/ TLM4/ TLM5	
43	Querying Data and User Defined Functions	1	31-10-2022		TLM2/ TLM4/ TLM5	
44	HBase: HBase Concepts, Clients, Example, HBase vs RDBMS	1	1-11-2022		TLM2/ TLM4/ TLM5	
45	Big SQL: Introduction	1	2-11-2022		TLM2/ TLM4/ TLM5	
46	Assignment - 4	1	4-11-2022		TLM6	
No. of classes required to complete UNIT-IV		07		No. of classes taken:		

UNIT-V: DATA ANALYTICS WITH R

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
47	In-database Analytics – SQL Essentials, Advanced SQL and MADlib for In-database Analytics	1	5-11-2022		TLM2	
48	The Endgame, or Putting it All Together, Operationalizing an Analytics Project	1	9-11-2022		TLM2	
49	Data Visualization Techniques	1	11-11-2022		TLM2	
50	Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,	1	12-11-2022		TLM2	
51	Collaborative Filtering, Big Data Analytics with BigR	1	14-11-2022		TLM2	

52	Data models for managing big data, Real-time streaming data analytics	1	15-11-2022		TLM2
53	Scalable analytics on large data sets	1	16-11-2022		TLM2
54	Systems architecture for big data management	1	16-11-2022		TLM2
55	Main memory data management techniques	1	16-11-2022		TLM2
56	Assignment - 5	1	18-11-2022		TLM6
57	Review	1	19-11-2022		TLM2
No. of classes required to complete UNIT-V		10		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
58						
59						
60						
61						
62						

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

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	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	Programming Paradigms: To inculcate algorithmic thinking, formulation techniques and visualization, leading to problem solving skills using different programming paradigms.
PSO 2	Data Engineering: To inculcate an ability to Analyse, Design and implement data driven applications into the students.
PSO 3	Software Engineering: Develop an ability to implement various processes / methodologies /practices employed in design, validation, testing and maintenance of software products

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	R PAVITRA			Dr.B.Srinivasa Rao
Signature				

S.no	Date	Experiment	Signature
1.	13/07/2022	Downloading and installing Hadoop; Understanding different Hadoop modes. Startup Scripts, Configuration files.	
2.	20/07/2022	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files	
3.	27/07/2022 03/08/2022	Implementation of Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm	
4.	10/08/2022- 17/08/2022	Implementation of Matrix Multiplication with Hadoop Map Reduce	
5.	24/08/2022 07/09/2022	Implementation of K-means clustering using map reduce	
6.	14/09/2022 28/09/2022	Installation of Hive along with practice examples.	
7.	19/10/2022	Installation of HBase, Installing thrift along with Practice examples	
8.	26/10/2022 02/11/2022 09/11/2022	Installation of R, along with Practice examples in R.	



DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : **Mrs. S. JYOTHI**
CourseName : **SOFTWARE REQUIREMENTS ENGINEERING** Code :17CI27
L-T-P Structure : **3-0-0** Credits :**3**
Program/Sem/Sec :**B.Tech.(IT),VII-Sem.,Sections- A&B** A.Y : **2022-23**

PRE-REQUISITE: Knowledge of Software Engineering, testing methods, Project Management.

COURSE EDUCATIONAL OBJECTIVES (CEOs): The main objective of this course is to know the elicitation, analysis, modelling and specification of software engineering requirements. Student will learn, in depth, the various selected models, tools, notations and validation techniques for the analysis and specification of system requirements that will enable him to apply these in subsequent projects and work experiences. It also about the need for requirements in large-scale systems and stakeholders involved in requirements engineering

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

CO 1	Understand the basics of requirements engineering and process maturity.
CO 2	Apply the requirement elicitation methods to specify documentation.
CO 3	Validate the requirements through various test approaches and management requirements.
CO 4	Estimate the software size with various techniques.
CO 5	Apply requirement management tools and software estimation tools for cost estimation and productivity

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	2	2	2	-	-	-	-	-	-	-	-	-	2	3	2
CO2	2	2	3	-	-	-	-	-	-	-	-	-	2	2	2
CO3	2	2	2	-	-	-	-	-	-	-	-	-	2	2	2
CO4	2	2	2	-	-	-	-	-	-	-	-	-	2	2	2
CO5	2	2	2	-	-	-	-	-	-	-	-	-	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:

T1. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, Pearson Education, 2nd edition [1,2,3 units].

T2. Reema Thareja, Data Structures using c, Oxford Publications [3,4,5].

REFERENCE BOOKS:

1. Software Requirements, Karl E. Wiegers, Word Power Publishers, 2000
2. Software Requirements and Estimation, Rajesh Naik, Swapna Kishore, TMH

E-Books and Online Course Materials:

1. Requirements Engineering: A Good practice Guide, Ian Sommerville, Pete Sawyer, Pearson, 2004.
2. Managing Software Requirements A Use Case Approach, 2/e, Dean, Don, Addison-Wesley, 2003.
3. Requirements Engineering and Rapid Development, Ian Graham, Addison-Wesley, 1998.
4. Mastering the Requirements Process, 2/e, S. Robertson, J. Robertson, Pearson, 2006.
5. <https://www.youtube.com/watch?v=h716Kl8lafa>
6. <https://www.vutube.edu.pk/vu-lectures/.../software-requirement-engineering-cs708>
7. freevideolectures.com > Computer Science > IIT Bombay
8. <https://nptel.ac.in/courses/106101061/5>

Online Courses and Video Lectures:

1. NPTEL COURSE : SOFTWARE ENGINEERING
2. <https://nptel.ac.in/courses/106/101/106101061/>

PART-B**COURSE DELIVERY PLAN (LESSON PLAN):****UNIT-I: INTRODUCTION TO REQUIREMENTS ENGINEERING**

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 Software Requirements, Definition, Levels of Requirements	1	11-07-2022		TLM2	
2.	Requirement Engineering, Requirements Development and Management	1	12-07-2022		TLM2	
3.	When Bad Requirements happen to Nice People	1	14-07-2022		TLM2	
4.	Benefits from a High quality requirements process, Characteristics of Excellent Requirements & Functional and Non-functional Requirements	1	15-07-2022		TLM2	
5.	Good Practices for Requirements Engineering	1	18-07-2022		TLM2	
6.	Practical process Improvement,	1	19-07-2022		TLM2	
7.	Process Maturity	1	21-07-2022		TLM2	
8.	Requirement Engineering process maturity	1	22-07-2022		TLM2	
9.	Revision	1	25-07-2022		TLM2	
No. of classes required to complete UNIT-I:			9	No. of classes taken:		

UNIT-II: REQUIREMENTS ELICITATION, ANALYSIS AND DOCUMENTATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
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1.	IntroductionToRequirements Elicitation	1	26-07-2022		TLM2	
2.	Requirements Elicitation Guidelines	1	28-07-2022		TLM2	
3.	Requirements Elicitation Techniques	1	29-07-2022		TLM2	
4.	Requirement Analysis	1	01-08-2022		TLM2	
5.	Requirement Analysis Models	1	02-08-2022		TLM2	
6.	Requirement Analysis and Negotiation	1	04-08-2022		TLM2	
7.	Requirements Documentation	1	05-08-2022		TLM2	
8.	Characteristics of Software Requirements Specification Document	1	08-08-2022		TLM2	
9.	Contents of SRS	1	11-08-2022		TLM2	
10	Contents of SRS	1	12-08-2022			
11.	REVISION	1	16-08-2022		TLM2	
No. of classes required to complete UNIT-II :11				No. of classes taken:11		

UNIT-III: REQUIREMENTS VALIDATION AND MANAGEMENT

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.	Validation objectives, Review the Requirements, The Inspection Process	1	18-08-2022		TLM2	
2.	Requirements Review Challenges, Testing the Requirements	1	22-08-2022		TLM2	
3.	Defining Acceptance Criteria, Requirement Validation Guidelines.	1	23-08-2022		TLM2	
4.	Requirements Management	1	25-08-2022		TLM2	
5.	Requirement Traceability, Database to Manage Requirements	1	26-08-2022		TLM2	
6.	Change Management Policies	1	29-08-2022		TLM2	
7.	Requirements Engineering for Critical Systems	1	30-08-2022		TLM2	
8.	Software Requirements and Risk Management.	1	01-09-2022		TLM2	
9.	Revision	1	02-09-2022		TLM2	
No. of classes required to complete UNIT-III : 9				No. of classes taken: 9		

UNIT-IV : SOFTWARE SIZE ESTIMATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
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1.	Introduction to Software Estimation	1	26-09-2022		TLM2	
2.	Size Estimation	1	27-09-2022		TLM2	
3.	Two views of Sizing	1	29-09-2022		TLM2	
4.	Function Point Analysis	1	30-09-2022		TLM2	
5.	Mark II FPA, Full Function Points	1	6-10-2022		TLM2	
6.	LOC Estimation	1	7-10-2022		TLM2	
7.	Conversion between Size Measures	1	10-10-2022		TLM2	
8.	Revision	1	11-10-2022		TLM2	
9.	Revision	1	13-10-2022		TLM2	
No. of classes required to complete UNIT-IV:9				No. of classes taken: 9		

UNIT-V :EFFORT — SCHEDULE, COST ESTIMATION & TOOLS

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 Productivity	1	14-10-2022		TLM2	
2.	Estimation Factors , Approaches for Effort and Schedule Estimation	1	17-10-2022		TLM2	
3.	COCOMOII , Putnam Estimation Model, Algorithmic Models	1	18-10-2022		TLM2	
4.	Cost Estimation	1	20-10-2022		TLM2	
5.	Introduction to Tools & Desirable Features of Requirements Management Tools	1	21-10-2022		TLM2	
6.	Some Requirements Management Tools Available	1	25-10-2022		TLM2	
7.	Rational pro - Desirable Features in Software Estimation Tools	1	27-10-2022		TLM2	
8.	Some Software Estimation Tools Available	1	28-10-2022		TLM2	
9.	Revision	1	31-10-2022		TLM2	
10.	Revision	1	1-11-2022		TLM2	
No. of classes required to complete UNIT-V : 10				No. of classes taken: 10		

Content 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.	Programs related to codevita	1	03-11-2022		TLM5	
2.	Each Student Created Individual Mini Project	10	04-11-2022		TLM5	

Teaching Learning Methods

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

Teaching Learning Methods

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

PART-C**EVALUATION PROCESS (R20 Regulations):**

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):

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 modelling to complex engineering activities with an understanding of the limitations
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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.

Title	Course Instructor	Course Coordinator	Module Coordinator	Head of the Department
Name of the Faculty	Mrs. S. JYOTHI			Dr. B. Srinivasa Rao
Signature				