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., A.Y : 2021-22

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	**Analyze** various delivery and deployment models.
CO 2	**Analyze** the virtual machine provisioning and virtualized storage strategies.
CO 3	**Explore** the PAAS and SAAS Services.
CO 4	**Identify** the issues in monitoring and management in cloud environment for achieving Quality of Service (QOS).
CO 5	**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	1	3	-	1	2	1	2	-	-	-	1	1	3	1	2
CO2	1	3	-	1	2	-	-	-	-	-	2	1	3	1	2
CO3	1	3	-	1	2	-	-	-	-	-	1	1	2	1	3
CO4	1	3	-	1	2	-	-	-	-	-	1	1	2	1	3
CO4	1	3	-	1	2	-	-	-	-	-	2	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",RajkumarBuyya,James Broberg, AndrzejGoseinski, 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	29/09/21		TLM2	
2.	Foundations: Introduction to Cloud Computing	1	30/09/21		TLM2	
3.	Migrating Cloud	1	01/10/21		TLM2	
4.	Migrating Cloud	1	06/10/21		TLM2	
5.	Migrating Cloud	1	07/10/21		TLM2	
6.	Enriching the Integration as a Service	1	08/10/21		TLM2	
7.	Enriching the Integration as a Service	1	20/10/21		TLM2	
8.	Cloud Computing for Enterprise Application	1	21/10/21		TLM2	
	Revision On Unit-1& Assignment-I		21/10/21		TLM2,6	
No. of classes required to complete UNIT-I: 8				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	22/10/21		**TLM2**	
2.	VM provisioning manageability services	1	27/10/21		**TLM2**	
3.	On the management of virtual machines for cloud infrastructures	1	28/10/21		**TLM2**	
4.	On the management of virtual machines for cloud infrastructures	1	29/10/21		**TLM2**	
5.	Enhancing cloud computing environments using cluster as a service	1	03/11/21		**TLM2**	
6.	Enhancing cloud computing environmentsusing cluster as a service	1	05/11/21		**TLM2**	
	Revision of UNIT-2 & Assignment-II		05/11/21		**TLM2**	
No. of classes required to complete UNIT-II: 6				No. of classes taken:		

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 privateand public cloud	1	10/11/21		**TLM2**	
2.	Aneka - integration of private and publicCloud	1	11/11/21		**TLM2**	
3.	Comet Cloud : An Automatic Cloud Engine	1	12/11/21		**TLM2**	
4.	Comet Cloud : An Automatic Cloud Engine	1	17/11/21		**TLM2**	
5.	T-Systems cloud-based Solutions for Business Applications	1	18/11/21		**TLM2**	
6.	T-Systems cloud-based Solutions for Business Applications	1	19/11/21		**TLM2**	
	Revision of UNIT-3 & Assignment-III				**TLM2**	
No. of classes required to complete UNIT-III: 6				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	24/11/21		**TLM2**	
2.	Workflow Engine for Clouds	1	25/11/21		**TLM2**	
3.	Understanding Scientific applications for cloud environment	1	26/11/21		**TLM2**	
4.	Understanding Scientific applications for cloud environment	1	1/12/21		**TLM2**	
5.	The Map reduce programming model and implementations	1	2/12/21		**TLM2**	
6.	The Map reduce programming model and implementations	1	3/12/21		**TLM2**	
7.	The Map reduce programming model andimplementations	1	8/12/21		**TLM2**	
8.	**Revision of UNIT-4& Assignment-IV**	1	9/12/21		**TLM2**	
No. of classes required to complete UNIT-IV: 8				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	1012/21		**TLM2**	
2.	An architecture for Federal Cloud computing	1	15/12/21		**TLM2**	
3.	SLA Management inCC: a service provider's perspective	1	16/12/21		**TLM2**	
4.	SLA Management inCC: a service provider's perspective	1	17/12/21		**TLM2**	
5.	Performance prediction for HPC on clouds	1	22/12/21		**TLM2**	
6.	Performance prediction for HPC on clouds		23/12/21			

		1			**TLM2**	
7.	Architecting Cloud Applications for the Amazon Cloud	1	24/11/21		**TLM2**	
8.	Architecting Cloud Applications for the Amazon Cloud	1	29/11/21		**TLM2**	
	Revision of UNIT-5 & Assignment-V	1			**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	30/11/21		**TLM2**
2.	Amazon Foundation Course	1	31/11/21		**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	**Module Coordinator**	**HOD**
(Dr. K. Lavanya)	(Dr. K. Lavanya)	(Dr.B,Srinivasa Rao)

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT
PART-A

Name of Course Instructor : Mr. G. Rajendra
Course Name & Code : Design Patterns & 17IT12
L-T-P Structure : 3-0-0 **Credits:** 3
Program/Sem/Sec : B.Tech., IT., VII-Sem., **A.Y:** 2021-22

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 Ahalloway, "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	27-09-2021		**TLM2**	
2.	What is Design pattern? Design patterns in Smalltalk MVC	1	28-09-2021		**TLM2**	
3.	Describing Design patterns	1	30-09-2021		**TLM2**	
4.	The catalog of Design patterns	1	04-10-2021		**TLM2**	
5.	**Tutorial-1**	1	05-10-2021		**TLM3**	
6.	Organizing the catalog	1	07-10-2021		**TLM2**	
7.	How design patterns solve design problems	1	11-10-2021		**TLM2**	
8.	**Tutorial-2**	1	18-10-2021		**TLM3**	
9.	**Assignment/Quiz-1**	1	19-10-2021		**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	21-10-2021		**TLM2**	
11.	Document structure, Formatting,	1	25-10-2021		**TLM2, TLM9**	
12.	Embellishing the user interface,	1	26-10-2021		**TLM1**	
13.	Supporting Multiple look-and-feel standards **Tutorial-3**	1	28-10-2021		**TLM2** **TLM3**	
14.	User operations spelling checking and Hyphenation summary	1	01-11-2021		**TLM2**	
15.	**Tutorial-4** Assignment/Quiz-2	1	02-11-2021		**TLM3** **TLM2**	
No. of classes required to complete UNIT-II		08	No. of classes taken:			

(8-11-2021,9-11-2021,11-11-2021) 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
16.	**Creational Patterns**: Abstract factory, Builder	1	15-11-2021		**TLM2**	
17.	Factory method, Prototype	1	16-11-2021		**TLM2**	
18.	singleton, Discussion on creational patterns, **Tutorial-5**	1	18-11-2021		**TLM2, TLM9**	
19.	Structural pattern part –I: Adapter Bridge, Composite	1	22-11-2021		**TLM2, TLM9**	
20.	Structural pattern part –II: Decorator	1	23-11-2021		**TLM6**	
21.	Façade, Flyweight, Proxy **Tutorial-6,**	1	25-11-2021		**TLM2**	
22.	**Assignment/Quiz-3**	1	29-11-2021			
No. of classes required to complete UNIT-III		7	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
23.	**Behavioral pattern part –I**: Chain of responsibility, Command	1	30-11-2021		**TLM2**	
24.	**Behavioral pattern part I**: Interpreter, Iterator.	1	02-12-2021		**TLM2**	
25.	**Tutorial -7 Behavioral pattern part –II**: Mediator, Observer	1	06-12-2021		**TLM3 TLM2**	
26.	**Behavioral pattern part –II**: State, Strategy	1	07-12-2021		**TLM2**	
27.	**Behavioral pattern part –II**: Template Method, Visitor	1	09-12-2021		**TLM2**	
28.	Discussion of Behavioral patterns	1	13-12-2021		**TLM2**	
29.	**Tutorial -8 Assignment/Quiz-4**	1	14-12-2021		**TLM9 TLM3**	
No. of classes required to complete UNIT-IV		7	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
30.	What to expect from Design patters, A brief history	1	16-12-2021		**TLM2**	
31.	What to expect from Design patters, A brief history	1	20-12-2021		**TLM2**	
32.	An invitation, A pattern thought.	1	21-12-2021		**TLM3**	
33.	**Tutorial -10**	1	23-12-2021		**TLM2**	
34.	The pattern community	1	27-12-2021		**TLM3**	
35.	**Assignment/Quiz-5**	1	28-12-2021		**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
36.	Design Patterns in Java	1	30-12-2021			
37.	Introduction to Object-Oriented Design Patterns	1	30-12-2021			

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	**27-09-2021**		
I Phase of Instructions	27-09-2021	06-11-2021	6 W
I Mid Examinations	**08-11-2021**	**13-11-2021**	1W
II Phase of Instructions	15-11-2021	01-01-2022	7 W
II Mid Examinations	**03-01-2022**	**08-01-2022**	1W
Preparation and Practical	10-01-2022	15-01-2022	1W
Semester End Examinations	**17-01-2022**	**29-01-2022**	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. Rama Devi	Dr. B. Srinivasa Rao

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr K.Raviteja
Course Name & Code : BIG DATA ANALYTICS (17CI18)
L-T-P Structure : 2-2-0 Credits: 3
Program/Sem/Sec : B.Tech., IT, VII-Sem., Section – A A.Y : 2021 - 2022

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

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

1- Low **2** –Medium **3** High

TEXT BOOKS:

T1 Data Science and Big Data Analytics – Discovering, Analyzing, Visualizing and presenting data – EMC Education Services, EMC2, Wiley Publications, 2015.

T2 Tom White ―Hadoop: The Definitive Guide‖ Third Edit on, O'reily Media, 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 AnandRajaraman and Jefrey David Ulman, ―Mining of Massive Datasets‖, Cambridge University Press,2012.

R4 ArvindSathi, ―BigDataAnalytics: Disruptive Technologies for Changing the Game‖, MC Press, 2012, 2001.

PART-B

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	27-09-21			
2.	Big data characteristics, The Promotion of the Value of Big Data	1	28-09-21			
3.	Why Big Data, overview of Big Data, issues and challenges of Big Data	1	29-9-21			
4.	stages of analytical evolution, State of the Practice in Analytics	1	01-10-21			
5.	The Data Scientist	1	04-10-21			
6.	Big Data Analytics in Industry Verticals	1	05-10-21			
7.	Data Analytics Lifecycle	1	08-10-21			
8.	Data Analytics Lifecycle	1	11-10-21			
9.	Data Analytics Lifecycle	1	11-10-21			
10.	Basic Data Analytic Methods Using R	1	12-10-21			
11.	Basic Data Analytic Methods Using R	1	13-10-21			
12.	Big Data Use Cases-Characteristics of Big Data Applications	1	18-10-21			
13.	Big Data Use Cases-Characteristics of Big Data Applications	1	18-10-21			
14.	Assignment – 1	1	20-10-21			
No. of classes required to complete UNIT-I		14				

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	20-10-21			
16.	MapReduce and Hadoop	1	22-10-21			
17.	The design of HDFS	1	25-10-21			
18.	HDFS concepts	1	26-10-21			
19.	Command line interface to HDFS	1	27-10-21			
20.	Hadoop File system Interfaces	1	29-10-21			
21.	Java Interface to Hadoop	1	29-10-21			
22.	Anatomy of a file read, Anatomy of a file write	1	01-11-21			
23.	Replica placement and Coherency Model	1	02-11-21			
24.	Parallel copying with distcp	1	02-11-21			
25.	keeping an HDFS cluster balanced	1	03-11-21			
26.	Advantages of Hadoop and HDFS	1	03-11-21			
27.	Big data Technological approaches and Potential use cases for Big Data Clustering, Regression	1	05-11-21			
28.	Assignment - 2	1	05-11-21			
No. of classes required to complete UNIT-II		14				

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	15-11-21			
30.	Anatomy of a Map Reduce Job Run	1	16-11-21			
31.	Failures, Job Scheduling	1	17-11-21			
32.	Failures, Job Scheduling	1	17-11-21			
33.	Shuffle and Sort	1	19-11-21			
34.	Task Execution	1	19-11-21			
35.	Map Reduce Types and Formats	1	22-11-21			
36.	Map Reduce Features	1	23-11-21			
37.	Map Reduce Features	1	23-11-21			
38.	Assignment - 3	1	23-11-21			

No. of classes required to complete UNIT-III	10		

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
39.	Big Data Analytics - Demos, Hadoop and the Amazon Cloud	1	24-11-21			
40.	Query languages for Hadoop, Spreadsheet-like analytics, Stream Computing	1	24-11-21			
41.	Pig: Introduction to PIG, Execution Modes of Pig Comparison of Pig with Databases, Grunt, Pig Latin.	1	26-11-21			
42.	User Defined Functions, Data Processing operators	1	26-11-21			
43.	Hive: Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables	1	29-11-21			
44.	Querying Data and User Defined Functions	1	29-11-21			
45.	Hbase:HBasics, Concepts, Clients, Example, HbaseVersus RDBMS	1	30-11-21			
46.	Hbase:HBasics, Concepts, Clients, Example, HbaseVersus RDBMS	1	30-11-21			
47.	Big SQL: Introduction	1	01-12-21			
48.	Assignment - 4	1	01-12-21			
No. of classes required to complete UNIT-IV		07				

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
49.	In-database Analytics – SQL Essentials, Advanced SQL and MADlib for In-database Analytics	2	03-12-21 & 06-12-21			
50.	The Endgame, or Putting it All Together, Operationalizing an Analytics Project	1	07-12-21			
51.	Data Visualization Techniques	2	08-12-21,10-12-21			
52.	Machine Learning: Introduction, Supervised Learning, Unsupervised Learning,	2	13-12-21 & 14-12-21			

53.	Collaborative Filtering, Big Data Analytics with BigR, Data models for managing big data, Real-time streaming data analytics	2	15-12-21 & 17-12-21			
54.	Scalable analytics on large data sets, Systems architecture for big data management	2	20-12-21 & 21-12-21			
55.	Main memory data management techniques	3	22-12-21 & 24-12-21 , 27-12-21			
56.	Assignment - 5	1	28-12-21			
57.	Review	1	29-12-21 & 31-12-21			
No. of classes required to complete UNIT-V		16		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 (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, demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics, 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, 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	The ability to apply Software Engineering practices and strategies in software project development using open-source programming environment for the success of organization.
PSO 2	The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.
PSO 3	To inculcate an ability to analyze, design and implement database applications.

Course Instructor	Module Coordinator	HOD
Mr K. Raviteja	**Dr K.Lavanya**	**Dr B.Srinivasa Rao**

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

DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : **Mr.K.RAVITEJA**
Course Name & Code : **BIG DATA WITH HADOOP LAB – 17CI68**

L-T-P Structure : 0-0-2 Credits : 1
Program/Sem/Sec : B.Tech., IT., VII-Sem., A.Y : 2020-21

PRE-REQUISITE: JAVA Programming

COURSE OBJECTIVE:. This course provides practical, foundation level training that enables immediate and effective participation in Big Data and other Analytics projects using HADOOP and R.

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

CO1: Preparing for data summarization, query, and analysis.

CO2: Applying data modelling techniques to large data sets.

CO3: Creating applications for Big Data analytics.

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

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

Course Code	COs	Programme Outcomes												PSOs		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
17CI62	CO1	3	3	3	2	3	-	-	-	-	-	-	1	2	3	3
	CO2	3	2	2	2	3	-	-	-	-	-	-	1	2	2	2
	CO3	3	3	3	2	3	1	-	-	-	-	-	1	2	3	3
	CO4	-	-	-	-	-	-	-	2	2	2	-	-	-	-	-
1 = Slight (Low) **2 = Moderate (Medium)** **3-Substantial(High)**																

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 RECOMMENDED TEXTBOOKS:

1. Tom White ―Hadoop: The Definitive Guide‖ Third Edit on, O‘reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015

REFERENCES:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis‖, Springer, 2007.
2. Jay Liebowitz, ―Big Data and Business Analytics‖ Auerbach Publications, CRC press (2013).
3. Anand Rajaraman and Jef rey David Ulman, ―Mining of Massive Datasets‖, Cambridge University Press,2012.
4. ArvindSathi, ―BigDataAnalytics: Disruptive Technologies for Changing the Game‖, MC Press, 2012, 2001.
5. http://nptel.ac.in/courses/106104135/48
6. http://nptel.ac.in/courses/110106064/

PART-B

LAB LESSON PLAN:

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.	Downloading and installing Hadoop; Understanding different Hadoop modes. Startup scripts, Configuration files.	2	19-08-2020		**TLM8/TLM5**	
2.	Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files.	2	26-08-2020 02-09-2020		**TLM8/TLM5**	
3.	Implementation of Matrix Multiplication with Hadoop Map Reduce,	2	09-09-2020		**TLM8/TLM5/TLM4**	
4.	Implementation of Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.	2	16-09-2020 23-09-2020		**TLM8/TLM5/TLM4**	
5.	Implementation of K-means clustering using map reduce.	2	7-10-2020		**TLM8/TLM5/TLM4**	
6.	Installation of Hive along with practice examples.	2	14-10-2020		**TLM8/TLM5**	
7.	Installation of HBase, Installing thrift along with Practice examples.	2	21-10-2020		**TLM8/TLM5**	
8.	Installation of R, along with Practice examples in R.	2	28-10-2020 04-11-2020		**TLM8/TLM5**	

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
I Phase of Instructions-1	17-08-2020	03-10-2020	7W
I Mid Examinations	28-09-2020	03-10-2020	
II Phase of Instructions	05-10-2020	21-11-2020	7W
II Mid Examinations	16-11-2020	21-11-2020	
Preparation and Practical's	23-11-2020	28-11-2020	1 W
Semester End Examinations	30-11-2020	14-12-2020	2W

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.

Course Instructor	Module Coordinator	HOD
Mr.K.RAVITEJA	**Dr. K.LAVANYA**	**Dr. B. Srinivasa Rao**

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PART-A

Name of Course Instructor : Mr. V.V.R.Manoj
Course Name & Code : Bioinformatics& 17IT92 (Add-on course III)
L-T-P Structure : 4-0-0 Credits : 3
Program/Sem/Sec : B.Tech., I.T., VII-Sem. A.Y : 2021-22

PRE-REQUISITE: AI, Data Mining, Biology concepts like Cell, DNA, RNA etc.

COURSE EDUCATIONAL OBJECTIVES (CEOs): To explain the fundamental concepts of Bioinformatics, to make the students familiar to information resources. Expertise the students to analyses DNA Sequence. To make students to be explore in the concepts of searching and pairwise techniques. To motivate students to do projects using micro array data.

COURSE OUTCOMES (COs): At the end of the course, students can

CO 1	Identify basic concepts of Bioinformatics.
CO 2	Analyze DNA Sequence by using information resources
CO 3	Summarize concepts of pair wise techniques and searching techniques
CO 4	Analyze multiple sequence alignment & Phylogenetic Analysis.
CO5	Apply analysis packages on micro array data.

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

TEXT BOOKS:

T1 Introduction to Bioinformatics T K Attwood And D.J. Parry-Smith, Pearson
T2 Bioinformatics methods and applications S.C. Rastogi, N. Mendiratta And P.Rastogi., PHI

REFERENCE BOOKS:

R1	Introduction to Bioinformatics Arthur M. Lesk OXFORD Publishers (Indian Edition)
R2	Elementary Bioinformatics, ImtiyazAlam Khan, Pharma Book Syndicate

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 and COs	1	27/09/2021		TLM2	
2.	Introduction to Unit-I, Definitions	1	28/09/2021		TLM2	
3.	Molecular Biology and Bioinformatics	1	29/09/2021		TLM2	
4.	Sequencing, Biological sequence/structure	1	04/10/2021		TLM2	
5.	Genome Projects, Pattern Recognition and prediction	1	05/10/2021		TLM2	
6.	Folding problem, Sequence Analysis	1	06/10/2021		TLM2	
7.	Homology and Analogy, Bioinformatics Applications	1	09/10/2021		TLM2	
8.	Central Dogma of Molecular Biology,	1	11/10/2021		TLM2	
9.	**Assignment-I**	1	18/10/2021		TLM2	
No. of classes required to complete UNIT-I: 09				No. of classes taken:		

UNIT-II: Information Resources and DNA Sequence Analysis

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.	Biological databases, Primary Sequence databases	1	20/10/2021		TLM2	
2.	Protein sequence databases, Secondary databases	1	23/10/2021		TLM2	
3.	Protein pattern databases, Structure classification databases	1	25/10/2021		TLM2	
4.	DNA sequence databases, Specialized genomic resources	1	26/10/2021		TLM2	
5.	Importance of DNA analysis, Gene Structure and DNA sequences	1	27/10/2021		TLM2	
6.	Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches	1	30/10/2021		TLM2	
7.	Gene Hunting, Profile of a cell	1	01/11/2021		TLM2	
8.	EST analysis, Effects of EST data on DNA databases	1	02/11/2021		TLM2	
9.	The Human Genome Project	1	03/11/2021		TLM2	
10.	Assignment-II	1	06/11/2021		TLM2	
No. of classes required to complete UNIT-II:10				No. of classes taken:		

08/11/2021 to 13/11/2021 MID-I Examination

UNIT-III: Pair wise Alignment Techniques and Secondary Database 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
1.	Introduction to Unit-III	1	15/11/2021		TLM2	
2.	Database Searching	1	16-11-21		TLM2	
3.	Alphabets and complexity Algorithm and programs	1	17-11-21		TLM2	
4.	Comparing two sequences, sub-sequences	1	20-11-21		TLM2	
5.	Identity and similarity The Dot plot	1	22-11-21		TLM2	
6.	Global similarity	1	23-11-21		TLM2	
7.	Local similarity Different alignment techniques Scoring Matrices, Dynamic Programming	1	24-11-21		TLM2	
8.	Pair wise database searching, Importance and need of secondary database searches	1	27-11-21		TLM2	
9.	Secondary database structure and building a sequence search protocol, Assignment - III	1	29-11-21		TLM2	
No. of classes required to complete UNIT-III:09				No. of classes taken:		

UNIT-IV: Multiple Sequence Alignment and Phylogenetic Analysis

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 Unit-IV	1	30-11-21		**TLM2**	
2.	Definition and goal, The consensus, Computational complexity	1	01-12-21		**TLM2**	
3.	Manual methods, Simultaneous methods	1	04-12-21		**TLM2**	
4.	Progressive methods, Databases of Multiple alignments, and searching,	1	06-12-21		**TLM2**	
5.	Applications of Multiple Sequence alignment	1	07-12-21		**TLM2**	
6.	Methods of Phylogenetic Analysis	1	08-12-21		**TLM2**	
7.	Tree Evaluation	1	11-12-21		**TLM2**	
8.	Problems in Phylogenetic analysis	1	13-12-21		**TLM2**	
9.	Tools for Phylogenetic Analysis, Assignment - IV	1	14-12-21		**TLM2**	

No. of classes required to complete UNIT-IV: 09				No. of classes taken:		

UNIT-V : Gene Expression and Microarrays and Analysis Packages Security

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 Unit-V	1	15-12-21		**TLM2**	
2.	DNA Microarrays	1	18-12-21		**TLM2**	
3.	Clustering Gene Expression Profiles	1	20-12-21		**TLM2**	
4.	Data Sources and tools, Applications Analysis Package structure	1	21-12-21		**TLM2**	
5.	Commercial databases,	1	22-12-21		**TLM2**	
6.	Commercial software, Comprehensive packages	1	27-12-21		**TLM2**	
7.	packages specializing in DNA analysis,	1	28-12-21		**TLM2**	
8.	Intranet Packages, Assignment - V	1	29-12-21		**TLM2**	
No. of classes required to complete UNIT-V:08				No. of classes taken:		

MID-II Examination 03/01/2022 to 08/01/2022

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	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.V.V.R.Manoj)	(Dr.K.Lavanya)	(Dr. B.Srinivasa Rao)

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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India
DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PROGRAM	**:** Information Technology, VII-Sem
ACADEMIC YEAR	**:** 2021-22
COURSE NAME & CODE	**:** Internet of Things – 17CI19
L-T-P STRUCTURE	**:** 2-2-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**:** K. PHANEENDRA

Pre-requisite:

- **Python Programming**

Course Educational Objective (CEO):The objective of this course is to explore the interconnection and integration of the physical world and the cyber space. Understand the design concepts in setting up IOT Devices. Study about the setup, configuration, and installation of equipment for IOT.

Course Outcomes (COs): After the completion of this course, the student will be able to:

CO1:Understand Device-processor communication models & protocols.

CO2:Understand the application areas of IOT.

CO3:Visualize the effect of internet on Mobile Devices, Cloud & Sensor Networks.

CO4:Acquire programming experience with Raspberry Pi kit to interface various devices.

CO5:Implement Programming models for IoT Cloud Environment.

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

SYLLABUS

UNIT - I:Introduction to Internet of Things: Introduction, Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabled Technologies, IoT Levels and Deployment Templates

UNIT - II:Domain Specific IoTs: Introduction, Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Lifestyle

UNIT - III:IoT AND M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT IoT System Management: Need for IoT Systems Management, SNMP, NETCONF, YANG, YANG-NETCONF, NETOPEER.

UNIT - IV: IoT Physical Devices & Endpoints: What is an IoT Device, Exemplary Device: Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry Pi Interfaces (Serial, SPI, and I2C), Programming Raspberry Pi with Python, Other IoT Devices

UNIT - V:IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models & Communication APIs, WAMP - AutoBahn for IoT, Xively Cloud for IoT, Python Web Application Framework – Django, Designing a RESTful Web API.

TEXTBOOKS:

T1. ArshdeepBahga and Vijay Madisetti, — **Internet of Things - A Hands-on Approach**, Universities Press, 2015, ISBN: 9788173719547.

T2. Matt Richardson & Shawn Wallace, O'Reilly (SPD),**Getting Started with Raspberry Pi**, 2014, ISBN: 978935023975.

REFERENCES:

R1. Pethuru Raj and Anupama C. Raman," **The Internet of Things: Enabling Technologies, Platforms, and Use Cases**", (CRC Press).

R2. Adrian McEwen, —**Designing the Internet of Things**, Wiley Publishers, 2013, ISBN: 978-1- 118-43062-0.

R3. Daniel Kellmereit, —**The Silent Intelligence: The Internet of Things**, 2013, ISBN: 0989973700.

R4.https://www.tutorialspoint.com/internet_of_things/internet_of_things_tutorial.pdf. http://nptel.ac.in/courses/106105166

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: Introduction to Internet of Things

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Course and Course Outcomes	1	28-09-2021		**TLM2**	CO1	**T1**	
2.	Introduction to Internet of Things, Characteristics	1	29-09-2021		**TLM2**	CO1	**T1**	
3.	Physical Design of IoT: Things in IoT	1	30-09-2021		**TLM2**	CO1	**T1**	
4.	IoT Protocols	1	1-10-2021		**TLM2**	CO1	**T1**	
5.	Logical Design of IoT: IoT Functional Block	2	5-10-2021 6-10-2021		**TLM2**	CO1	**T1**	
6.	IoT Communication Models	1	7-10-2021		**TLM2**	CO1	**T1**	
7.	IoT Communication API's, IoT Enabling Technologies	1	8-10-2021		**TLM2**	CO1	**T1**	
8.	IoT Levels and Deployment Templates	2	20-10-2021 21-10-2021		**TLM2**	CO1	**T1**	
9.	**Tutorial - I**	1	22-10-2021		**TLM2**	CO1	**T1**	
No. of classes required to complete UNIT-I		11			No. of classes taken:			

UNIT-II:Domain Specific IoTs

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Domain Specific IoT, Home Automation	2	22-10-2021 26-10-2021		**TLM2**	CO2	**T1**	
2.	Domain Specific IoT: Cities, Environment	1	27-10-2021		**TLM2**	CO2	**T1**	
3.	Domain Specific IoT: Energy, Retail	1	28-10-2021		**TLM2**	CO2	**T1**	
4.	Domain Specific IoT: Logistics	1	29-10-2021		**TLM2**	CO2	**T1**	
5.	Domain Specific IoT: Agriculture, Industry	1	2-11-2021		**TLM2**	CO2	**T1**	

6.	Domain Specific IoT: Health and Life Sciences	1	3-11-2021		**TLM2**	CO2	**T1**	
7.	**Tutorial-II**	1	5-11-2021		**TLM2**	CO2	**T1**	
No. of classes required to complete UNIT-II		8			No. of classes taken:			

UNIT-III:IoT AND M2M

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to M2M, Difference between IoT and M2M	2	16-11-2021 17-11-2021		**TLM2**	CO2	**T1**	
2.	Software defined Networking for IoT	1	18-11-2021		**TLM2**	CO3	**T1**	
3.	Network Function Virtualization	1	19-11-2021		**TLM2**	CO3	**T1**	
4.	Need for IoT System Management, Simple Network Management Protocol (SNMP)	2	23-11-2021 24-11-2021		**TLM2**	CO3	**T1**	
5.	Network operator requirements and NETCONF	1	25-11-2021		**TLM2**	CO3	**T1**	
6.	YANG Data Modeling Language	1	26-11-2021		**TLM2**	CO3	**T1**	
7.	IoT System Management with NETCONF - YANG	1	30-11-2021		**TLM2**	CO3	**T1**	
8.	**Tutorial -III**	1	1-12-2021		**TLM2**	CO3	**T1**	
No. of classes required to complete UNIT-III		10			No. of classes taken:			

UNIT-IV:IoT Physical Devices & Endpoints

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	What is an IoT Device, Building Blocks of IoT	1	02-12-2021		**TLM2**	CO4	**T1**	
2.	Raspberry Pi Board Components	2	3-12-2021 7-12-2021		**TLM2**	CO4	**T1**	
3.	Linux on Raspberry Pi	1	8-12-2021		**TLM2**	CO4	**T1**	
4.	**Tutorial- IV**	1	9-12-2021		**TLM2**	CO4	**T1**	
5.	Raspberry Pi Interfaces and Python Programming on Raspberry Pi	3	10-12-2021 14-12-2021 15-12-2021		**TLM2**	CO4	**T1**	
No. of classes required to complete UNIT- IV		08			No. of classes taken:			

UNIT-V:IoT Physical Servers and Cloud Offerings

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Cloud Storage Models and Communication API's, WAMP- Web Application Messaging Protocol	2	16-12-2021 17-12-2021		**TLM2**	CO5	**T1**	
2.	Xively Cloud for IoT	2	21-12-2021 22-12-2021		**TLM2**	CO5	**T1**	
3.	Python Web Application Framework- Django	1	23-12-2021		**TLM2**	CO5	**T1**	
4.	Design of RESTful Web API	2	24-12-2021 28-12-2021		**TLM2**	CO5	**T1**	
5.	**Tutorial -V**	1	29-12-2021		**TLM2**	CO5	**T1**	
No. of classes required to complete UNIT-V		08			No. of classes taken:			

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.	IoT network design and Cloud networks	1	30-12-2021		**TLM5**	
2.	IoT Service integration	1	31-12-2021		**TLM5**	

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
I Phase of Instructions-1	27-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	
II Phase of Instructions	15-11-2021	01-01-2022	7W
II Mid Examinations	03-01-2022	08-01-2022	
Preparation and Practical's	10-01-2022	15-01-2022	1W
Semester End Examinations	17-01-2022	29-01-2022	2W

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
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	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
K.Phaneendra	Dr. K. Anupriya	Dr B.Srinivasa Rao

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

PROGRAM	**:** Information Technology, VII-Sem
ACADEMIC YEAR	**:** 2021-22
COURSE NAME & CODE	**:** Internet of Things LAB – 17CI69
L-T-P STRUCTURE	**:** 0-0-2
COURSE CREDITS	**:** 1
COURSE INSTRUCTOR	**:** K. PHANEENDRA

Prerequisite: Python programming

Course Educational Objective (CEO): The objective of this course, to give a comprehensive view of the Internet of Things (Applications/ Potentials/ Challenges). To analyze enabling technologies to make it happen (Embedded Devices and communication protocols) and to conduct Hands on activities (Guidelines on how to operate things on the Internet of Things).

Course Outcomes (COs): After the completion of this course, the student will be able to:

CO1: Understand the application areas of IOT.

CO2: Understand building blocks of Internet of Things and characteristics.

CO3: Understand enabling technologies Embedded Devices and communication protocols for Hands on activities. Write programs using Python for processing Internet of Things.

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

COURSE DELIVERY PLAN (LESSON PLAN):

S.No.	Name of the Experiment	Expected Date	Actual Date	Remarks
	CYCLE-I			
1.	Start Raspberry Pi and try various Linux commands in command terminal windows, cd, touch, mv, rm, man, mkdir, rmdir, tar, gzip, cat, more, less, ps, sudo, cron, chown, chgrp, ping etc.	09-10-2021		
	CYCLE-II			
2.	1. Run some python programs on Pi like: 2. Read your name and print Hello message with name 3. Read two numbers and print their sum, difference, product, and division. 4. Word and character count of a given string.	23-10-2021		
3.	1. Area of a given shape (rectangle, triangle, and circle) reading shape and appropriate values from standard input 2. Print a name 'n' times, where name and n are read from standard input, using for and while loops. 3. Handle Divided by Zero Exception. 4. Print current time for 10 times with an interval of 10 seconds. 5. Read a file line by line and print the word count of each line.	30-10-2021		
	CYCLE-III			
4.	1. Light an LED through Python program 2. Get input from two switches and switch on corresponding LEDs.	06-11-2021		
	CYCLE-IV			
5.	1. Study and Configure Raspberry Pi. 2. Switch on a relay to Light an LED through Python program	20-11-2021		

I-MID EXAMINATIONS				
CYCLE-V				
6.	1. Access an image through a Pi web cam. 2. Control a light source using web page.	27-11-2021		
CYCLE-VI				
7.	1. Motion Detecting Sensor to open the room door and switch on the light. 2. Get an Alarm and Sprinkle water if Fire is detected in the room.	04-12-2021		
CYCLE-VII				
8.	1. Set the siren and open the door if smoke is detected in the room. 2. Smart Room Temperature Monitoring System.	11-12-2021		
	Internal Practical Examination	18-12-2021		

REFERENCES:

1. www.users.di.uniroma1.it/~spenza/files/labIoT2015/Lab-IoT-1.pdf.
2. www.mobileeducationkit.net/labmanuals/LAB-Manual-mbed.docx.

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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PSO 3	Develop IT application services with the help of different current engineering tools.

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	27-09-2021	06-11-2021	7W
I Mid Examinations	08-11-2021	13-11-2021	
II Phase of Instructions	15-11-2021	01-01-2022	7W
II Mid Examinations	03-01-2022	08-01-2022	
Preparation and Practical's	10-01-2022	15-01-2022	1W
Semester End Examinations	17-01-2022	29-01-2022	2W

	Instructor	Module Coordinator	HOD
Name	K. Phaneendra	Dr. K. Anupriya	Dr B. Srinivasa Rao
Sign with Date			

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DEPARTMENT OF MECHANICAL ENGINEERING
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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor : Mrs.K.S.L.LAVANYA
Course Name & Code : Utilization of Electrical Energy & 17EE81
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., IT, VII-Sem. A.Y : 2021-22

Pre-requisites : --NIL
Course Educational Objective: This course enables the student to familiarize with characteristics of various drives,comprehend the different issues related to heating,welding and illumination.

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

CO 1	Choose a drive for particular application
CO 2	Identify a heating /welding scheme for a given application
CO 3	Illustrate the different schemes of traction and its main components
CO 4	Develop a lighting scheme for a given practical case
CO5	Assess the economic aspects in utilization of electrical energy

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 a	PSO b	PSO c
CO1	3	2	3	-	2	-	-	-	-	-	-	1	-	-	-
CO2	3	2	1	2	-	-	-	-	-	-	-	1	-	-	-
CO3	3	1	3	-	3	-	-	-	-	-	-	2	-	-	-
CO4	3	2	2	2	-	-	-	-	-	-	-	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).

TEXT BOOKS:

T1: C.L.Wadhwa "Generation,Distribution and Utilization of Electrical energy, New Age International Publishers,3rd Edition,2015.

T2: N.V.Suryanarayana "Utilization of electric power including electric drives and electric traction,New age international publishers New Delhi,2nd edition 2014.

REFERENCE BOOKS:

R1: Art & Science of Utilization of electrical Energy, Partab, Dhanpat Rai & Co., 2004.
R2: Utilization of Electric Energy, E. Openshaw Taylor and V. V. L. Rao, Universities Press, 2009.

Part - B
COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: ELECTRIC HEATING &WELDING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning outcome cos	Text book followed	HOD Sign Weekly
1.	Introduction,CEO's &CO's	1	23-08-2021		TLM2	CO2	T1,T2	
2.	Advantages &applications of Electric heating	1	26-08-2021		TLM2	CO2	T1	
3.	Classification of electric heating	1	27-08-2021		TLM2	CO2	T1	
4.	Requirement of good heating material	1	2-09-2021		TLM2	CO2	T1	
5.	Induction heating,dielectric heating	1	3-09-2021		TLM2	CO2	T1	
6.	ARC Furnace	1	13-09-2021		TLM2	CO2	T2	
7.	Resistance welding	1	16-9-2021		TLM2	CO2	T2	
8.	Arc welding	1	17-09-2021		TLM2	CO2	T2	
No. of classes required to complete UNIT-I : 08							No. of classes taken: 08	

UNIT-II : ILLUMINATION ENGINEERING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome cos	Text book followed	HOD Sign Weekly
9.	Introduction	1	20-09-2021		TLM1/TLM2	CO4	T1/R1	
10.	Nature of light &Laws of illumination	1	23-09-2021		TLM1/TLM2	CO4	T1/T2	
11.	Lighting schemes,sources of light	1	24-09-2021		TLM1/TLM2	CO4	R1	
12.	Fluorescent Lamp, CFL and LED	1	27-09-2021		TLM1/TLM2	CO4	T1/R1	
13.	Sodium Vapour Lamp	1	30-09-2021		TLM1/TLM2	CO4	T1/R1	
14.	Neon lamps	1	1-10-2021		TLM1/TLM2	CO4	T1/R1	
15.	mercury vapour lamps	1	4-10-2021		TLM1/TLM2	CO4	T1/R1	
16.	Comparision between tungsten &fluroscent tubes	1	07-10-2021		TLM1/TLM2	CO4	T1	
17.	Requirements of good lighting &	1	08-10-2021		TLM1/TLM2	CO4	T1	

	Street lighting							
No. of classes required to complete UNIT-II : 09							No. of classes taken: 10	

UNIT-III : ELECTRIC DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome cos	Text book followed	HOD Sign Weekly
18	Introduction	1	18-10-2021		TLM1/TLM2	CO1	T1	
19	Factors affecting selection of motor	1	21-10-2021		TLM1/TLM2	CO1	T2	
20	Types of loads	1	22-10-2021		TLM1/TLM2	CO1	T2	
21	Size of motor,load eualization	1	25-10-2021		TLM1/TLM2	CO1	T2	
22	Industrial applications	1	28-10-2021		TLM1/TLM2	CO1	T2	
23	Elements of electric drive	1	29-10-2021		TLM1/TLM2	CO1	T2	
24	Steady state &characteristics of drives	1	01-11-2021		TLM1/TLM2	CO1	T2	
25	Transient characteristics of drives	1	4-11-2021		TLM1/TLM2	CO1	T2	
No. of classes required to complete UNIT-III : 08							No. of classes taken:	

UNIT-IV: ELECTRIC TRACTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome cos	Text book followed	HOD Sign Weekly
26	Introduction	1	05-11-2021		TLM1/TLM2	CO3	T1	
27	Requirement of an ideal traction system	1	15-11-2021		TLM1/TLM2	CO3	T1	
28	Supply system for electric traction	2	18-11-2021		TLM1/TLM2	CO3	T1/T2	
29	Train movement,mechanisam of train movement	1	19-11-2021		TLM1/TLM2	CO3	T1/T2	
30	Traction motors	1	22-11-2021		TLM1/TLM2	CO3	T1/T2	

31	Modern trends in electric traction	2	25-11-2021		TLM1/TLM2	CO3	T1/T2	
32	Automation in electric traction	1	26-11-2021		TLM1/TLM2	CO3	T1/T2	
33	problems	1	29-11-2021		TLM1/TLM2	CO3	T1/T2	
No. of classes required to complete UNIT-IV : 08							No. of classes taken:	

UNIT-V: REFRIGERATION AND AIR CONDITIONING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome cos	Text book followed	HOD Sign Weekly
34	Introduction& types of refrigeration	1	02-12-2021		TLM1/TLM2	CO5	T1/R1	
35	Compression refeigeration	1	03-12-2021		TLM1/TLM2	CO5	T2	
36	Basic vapour compression cycle	1	06-12-2021		TLM1/TLM2	CO5	R1	
37	Absorption refrigeration system &household refrigerator	2	09-12-2021 & 10-12-2021		TLM1/TLM2	CO5	R1	
38	Types of air conditioning system	2	13-12-2021 & 16-12-2021		TLM1/TLM2	CO5	R1	
39	Cooling capacity of an air conditioner	2	17-12-2021 & 20-12-2021		TLM1/TLM2	CO5	T1	
40	Summer air conditioning systems	1	23-12-2021		TLM1/TLM2	CO5	T1	
41	winter air conditioning systems	1	24-12-2021		TLM1/TLM2	CO5	T1	
42	REVISION	3	27-12-2021 30-12-2021		TLM1/TLM2	CO1,CO3,CO5	T1	
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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1	Economic aspects in utilization of electrical energy	1	31-12-2021		TLM1/ TLM2	CO5	T2,R1,R2	

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

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	27-09-2021	06-11-2021	6W
I Mid Examinations	08-11-2021	13-11-2021	1W
II Phase of Instructions	15-11-2021	01-01-2022	8W
II Mid Examinations	03-01-2022	08-01-2022	1W
Preparation and Practical	10-01-2022	15-01-2022	1W
Semester End Examinations	17-01-2022	29-01-2022	2W

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

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.	Able to demonstrate self-learning, life-long learning and work in teams on multidisciplinary projects.
PEO4.	Able to understand the professional code of ethics and demonstrate ethical behaviour, effective communication, team work and leadership skills in their job.

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

K.S.L.LAVANYA	K.S.L.LAVANYA		Dr.J.Siva vara prasad
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 A sec**
ACADEMIC YEAR	:	**2021-22**
COURSE CODE&NAME	:	**17IT90 & Real Time Operating Systems**
L-T-P STRUCTURE	:	**3 - -**
COURSE CREDITS	:	**3**
COURSE INSTRUCTOR	:	**Dr.Anupriya Koneru**
PRE-REQUISITES	:	**OS and CO**

COURSE EDUCATIONAL OBJECTIVES (CEOs):

In this course student will learn:

The primary goal of this course is to meet the students with basics of real time systems and to give the student knowledge and skills necessary to design and develop embedded application by means of real time operating system

COURSE OUTCOMES (COs):

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

CO1: Summarize the Components of Real Time Systems and their programming.

CO2: Differentiate the Static and Dynamic memory allocation strategies.

CO3: Apply Synchronization techniques for Resource management in Real Time Systems.

CO4: Analyze deadlock management techniques and communication in distributed systems.

CO5: Illustrate file management and data management techniques.

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	-	-	1	-	-	-	-	-	1	3	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	1	3	-	-
CO3	3	2	1	-	-	1	-	-	-	-	-	1	2	2	2
CO4	3	2	-	-	-	-	-	-	-	-	-	1	2	2	2
CO5	3	2	1	-	-	-	-	-	-	-	-	1	2	1	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:

T1 Douglas Wilhelm Harder, Jeff Zarnett, Vajih Montaghami and Allyson Giannikouris - A practical introduction to real-time systems for undergraduate engineering

BOS APPROVED REFERENCE BOOKS:

R1 Real time Operating Systems - Concepts and Implementation of Microkernels for Embedded Systems - Dr. Jürgen Sauermann, Melanie Thelen.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A/B/C

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
UNIT I								
Introduction To Real-Time Systems								
1	Discussion of Cos and CEOs of the course	1	20/09/2021		TLM1&2			
2	What is a real-time system?	1	24/09/2021		TLM1&2	1	1	
3	Case study: anti-lock braking system,	1	25/09/2021		TLM1&2	1	1	
4	Components of real-time systems, history of real-time programming.	1	27/09/2021		TLM1&2	1	1	
5	**TUTORIAL-1**	1	01/10/2021		**TLM3**	1		
Real-time, embedded and operating-system programming								
6	Programming languages, The C programming language,	1	4/10/2021		TLM1&2	1	1	
7	Software engineering and development	1	8/10/2021		TLM1&2	1	1	
8	Summary of real-time programming.	1	9/10/2021		TLM1&2	1	1	
9	**Assignment-1**	1	11/10/2021		TLM1&2	1		
No of classes required to completeUNITI:9				**No. of classes taken:**				
UNIT II								
Static memory allocation:								
10	The requirements of a function, The Cortex-M3 design,	1	16/10/2021		TLM1&2	2	1	
11	set jump and long jump	1	18/10/2021		TLM1&2	2	1	
12	Summary of static memory allocation	1	22/10/2021		TLM1&2	2	1	

13	**TUTORIAL-2**	1	23/10/2021		**TLM3**	2		
Dynamic memory allocation:								
14	Abstract dynamic memory allocator, Allocation strategies	1	25/10/2021		TLM1 & 2	2	1	
15	Case study: Free RTOS	1	29/10/2021		TLM1 & 2	2	1	
16	Case study: Free RTOS	1	30/10/2021		TLM1 & 2	2	1	
17	Other features: clearing and Summary of dynamic memory allocation.	1	1/11/2021		TLM1 & 2	2	1	
18	Other features: clearing and Summary of dynamic memory allocation.	1	5/11/2021		TLM1 & 2	2	1	
19	**Assignment-2**	1	6/112021		**TLM3**	2		
No. of classes required to complete UNIT-II:10				**No. of classes taken:**				

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
UNIT III								
Synchronization:								
20	The need for synchronization, Petri nets—describing synchronizations graphically, Semaphores—a better signal *without* polling, ,	1	15/11/2021		TLM1&2	3	1	
21	Synchronization through token passing, Test-and-reset—a crude signal with polling,	1	20/11/2021		TLM1&2	3	1	
22	Problems in synchronization, Automatic synchronization,	1	22/11/2021		TLM1&2	3	1	

	Summary of synchronization.							
23	**TUTORIAL-3**	1	22/11/2021		**TLM3**	3		
Resource management:								
24	Semaphores, Classification of resources	1	26/11/2021		TLM1&2	3	1	
23	Device management, Resource managers	1	27/11/2021		TLM1&2	3	1	
24	Priority and deadline inversion, Summary of resource management.	1	29/11/2021		TLM1&2	3	1	
25	**Assignment-3**	1	3/12/2021		**TLM3**	3		
No. of classes required to complete UNIT-III:08				**No. of classes taken:**				
UNIT IV								
Deadlock:								
26	Requirements for deadlock, Deadlock modelling,	1	4/12/2021		TLM1&2	4	1	
27	Techniques for preventing deadlock during the design	1	6/12/2021		TLM1&2	4	1	
28	Deadlock detection and recovery, Deadlock avoidance	1	10/12/2021		TLM1&2	4	1	
29	**TUTORIAL-4**	1	11/12/2021		**TLM3**	4		
Communication and distributed systems:								
30	Classification of communications, Solutions for communication,	1	13/12/2021		TLM1& 2	4	1	
31	Priorities of messages, Synchronization,	1	17/12/2021		TLM1& 2	4	1	
32	Coordination through election algorithms,	1	18/12/2021		TLM1& 2	4	1	
33	When a message is sent over Network communications.	1	20/12/2021		TLM1& 2	4	1	

34	**Assignment-4**	1	24/12/2021		**TLM3**	4		
No. of classes required to complete UNIT-IV:09				**No. of classes taken:**				

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
UNIT V								
File management:								
35	Block addressable, Files,	1	27/12/2021		TLM1&2	5	1	
36	Organization, File systems	1	31/12/2021		TLM1&2	5	1	
37	Data formats, the file abstraction, Keil RTX RTOS	1	3/1/2022		TLM1&2	5	1	
38	**TUTORIAL-5**	1	3/1/2022		**TLM3**	5		
Data management:								
39	Linear data structures	1	7/1/2022		TLM1& 2	5	1	
40	Hash tables, Graphs,	1	8/1/2022		TLM1& 2	5	1	
41	Non-relational databases, Relational databases.	1	10/1/2022			5	1	
42	**Assignment-5**	1	10/1/2022		**TLM3**	5	1	
No. of classes required to complete UNIT-V:08				**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	Learning Outcome Cos	Text Book followed	HOD Sign
1.	QOS requirement	1	8/1/2022		TLM1&2	4	1	
2.	Routing and Multicasting	1	8/1/2022		TLM1&2	5	1	

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	Units	Marks
Assignment– 1	1	A1=5
Assignment– 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10
Assignment– 3	3	A3=5
Assignment– 4	4	A4=5
Assignment– 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Online Quiz-2	3,4,5	C2=10
Evaluation of Assignment: A=Avg(Best of Four(A1,A2,A3,A4,A5))	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Online Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
Cumulative Internal Examination : A+B+C+D	**1,2,3,4,5**	**40**
Semester End Examinations : E	**1,2,3,4,5**	**60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	20/09/2021		
I Phase of Instructions	20/09/2021	06/11/2021	7W
I Mid Examinations	08/11/2021	13/11/2021	1W
II Phase of Instructions	15/11/2021	15/01/2022	9W
II Mid Examinations	17/01/2022	22/01/2022	1W
Preparation and Practical	24/01/2022	29/01/2022	2W
Semester End Examinations	31/01/2022	12/02/2022	2W

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	Pursue a successful career in the area of Information Technology or its allied fields.
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PO4	**Conduct investigations of complex problems**: Use research-based knowledge and researchmethods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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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	**Module Coordinator**	**HOD**
Signature			
Name of the Faculty	**Dr.K.Anupriya**	**Dr. K.Lavanya**	**Dr. B. Srinivasa Rao**

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE HANDOUT

Part-A

PROGRAM	:	**B.Tech (IT), V-Semester B sec**
ACADEMIC YEAR	:	**2021-22**
COURSE CODE&NAME	:	**17IT90 & Real Time Operating Systems**
L-T-P STRUCTURE	:	**3 - -**
COURSE CREDITS	:	**3**
COURSE INSTRUCTOR	:	**Dr.Anupriya Koneru**
PRE-REQUISITES	:	**OS and CO**

COURSE EDUCATIONAL OBJECTIVES (CEOs):

In this course student will learn:

The primary goal of this course is to meet the students with basics of real time systems and to give the student knowledge and skills necessary to design and develop embedded application by means of real time operating system

COURSE OUTCOMES (COs):

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

CO1: Summarize the Components of Real Time Systems and their programming.

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CO3: Apply Synchronization techniques for Resource management in Real Time Systems.

CO4: Analyze deadlock management techniques and communication in distributed systems.

CO5: Illustrate file management and data management techniques.

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	-	-	1	-	-	-	-	-	1	3	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	1	3	-	-
CO3	3	2	1	-	-	1	-	-	-	-	-	1	2	2	2
CO4	3	2	-	-	-	-	-	-	-	-	-	1	2	2	2
CO5	3	2	1	-	-	-	-	-	-	-	-	1	2	1	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:

T1 Douglas Wilhelm Harder, Jeff Zarnett, Vajih Montaghami and Allyson Giannikouris - A practical introduction to real-time systems for undergraduate engineering

BOS APPROVED REFERENCE BOOKS:

R1 Real time Operating Systems - Concepts and Implementation of Microkernels for Embedded Systems - Dr. Jürgen Sauermann, Melanie Thelen.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A/B/C

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
UNIT I								
Introduction To Real-Time Systems								
1.	Discussion of Cos and CEOs of the course	1	20/09/2021		TLM1&2	1		
2.	What is a real-time system?	1	23/09/2021		TLM1&2	1	1	
3.	Case study: anti-lock braking system,	1	25/09/2021		TLM1&2	1	1	
4.	Components of real-time systems	1	27/09/2021		TLM1&2	1	1	
5.	History of real-time programming.	1	30/09/2021		TLM1&2	1	1	
6.	**TUTORIAL-1**	1	02/10/2021		**TLM3**	1		
Real-time, embedded and operating-system programming								
7.	Programming languages, The C programming language,	1	04/10/2021		TLM1&2	1	1	
8.	Software engineering and development	1	7/10/2021		TLM1&2	1	1	
9.	Summary of real-time programming.	1	9/10/2021		TLM1&2	1	1	
10	**Assignment-1**	1	11/10/2021		TLM1&2	1		
No of classes required to completeUNITI:9				**No. of classes taken:**				
UNIT II								
Static memory allocation:								
11	The requirements of a function, The Cortex-M3 design,	1	16/10/2021		TLM1&2	2	1	
12	set jump and long jump	1	18/10/2021		TLM1&2	2	1	
13	Summary of static memory allocation	1	21/10/2021		TLM1&2	2	1	

14	**TUTORIAL-2**	1	23/10/2021		**TLM3**	2		
Dynamic memory allocation:								
15	Abstract dynamic memory allocator, Allocation strategies	1	25/10/2021		TLM1 & 2	2	1	
16	Case study: Free RTOS	1	28/10/2021		TLM1 & 2	2	1	
17	Case study: Free RTOS	1	30/10/2021				1	
18	Other features: clearing and Summary of dynamic memory allocation.	1	1/11/2021		TLM1 & 2	2	1	
19	Other features: clearing and Summary of dynamic memory allocation.	1	4/11/2021		TLM1 & 2	2	1	
20	**Assignment-2**	1	6/11/2021		**TLM3**	2		
No. of classes required to complete UNIT-II:10				**No. of classes taken:**				

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
UNIT III								
Synchronization:								
21.	The need for synchronization, Petri nets—describing synchronizations graphically, Semaphores—a better signal *without* polling	1	15/11/2021		TLM1&2	3	1	
22.	Synchronization through token passing, Test-and-reset—a crude signal with polling	1	18/11/2021		TLM1&2	3	1	
23.	Problems in synchronization	1	20/11/2021		TLM1&2	3	1	
24.	Automatic synchronization,	1	22/11/2021		TLM1&2	3	1	

	Summary of synchronization.							
25.	**TUTORIAL-3**	1	22/11/2021		**TLM3**	3		
Resource management:								
26.	Semaphores, Classification of resources	1	25/11/2021		TLM1&2	3	1	
27.	Device management, Resource managers	1	27/11/2021		TLM1&2	3	1	
28.	Priority and deadline inversion, Summary of resource management.	1	29/11/2021		TLM1&2	3	1	
29.	**Assignment-III**	1	2/12/2021		**TLM3**	3		
No. of classes required to complete UNIT-III:08				**No. of classes taken:**				
UNIT IV								
Deadlock:								
30.	Requirements for deadlock, Deadlock modelling,	1	2/12/2021		TLM1&2	4	1	
31.	Techniques for preventing deadlock during the design	1	4/12/2021		TLM1&2	4	1	
32.	Deadlock detection and recovery, Deadlock avoidance	1	6/12/2021		TLM1&2	4	1	
33.	**TUTORIAL-4**	1	6/12/2021		**TLM3**	4		
Communication and distributed systems:								
34.	Classification of communications, Solutions for communication,	1	09/12/2021		TLM1& 2	4	1	
35.	Priorities of messages, Synchronization,	1	11/12/2021		TLM1& 2	4	1	
36.	Coordination through election algorithms,	1	13/12/2021		TLM1& 2	4	1	
37.	When a message is sent over Network communications.	1	16/12/2021		TLM1& 2	4	1	
38.	**Assignment-IV**	1	16/12/2021		**TLM3**	4		
No. of classes required to complete UNIT-IV:09				**No. of classes taken:**				

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
UNIT V								

File management:								
39	Block addressable, Files,	1	18/12/2021		TLM1&2	5	1	
40	Organization, File systems	1	20/12/2021		TLM1&2	5	1	
41	Data formats, the file abstraction, Keil RTX RTOS	1	23/12/2021		TLM1&2	5	1	
42	**TUTORIAL-5**	1	27/12/2021		**TLM3**	5		
Data management:								
43	Linear data structures	1	30/12/2021		TLM1& 2	5	1	
44	Hash tables, Graphs,	1	3/1/2022		TLM1& 2	5	1	
45	Non-relational databases, Relational databases.	1	6/1/2022		TLM1& 2	5	1	
46	**Assignment-5**	1	8/1/2022		**TLM3**	5		
No. of classes required to complete UNIT-V:08				**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	Learning Outcome Cos	Text Book followed	HOD Sign
1.	QOS requirement	1	10/1/2022		TLM1&2	4	1	
2.	Routing and Multicasting	1	10/1/2022		TLM1&2	5	1	

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	Units	Marks
Assignment– 1	1	A1=5
Assignment– 2	2	A2=5
I-Mid Examination	1,2	B1=20
Online Quiz-1	1,2	C1=10
Assignment– 3	3	A3=5
Assignment– 4	4	A4=5
Assignment– 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Online Quiz-2	3,4,5	C2=10
Evaluation of Assignment: A=Avg(Best of Four(A1,A2,A3,A4,A5))	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Evaluation of Online Quiz Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	C=10
Attendance Marks based on Percentage of attendance		D=5
Cumulative Internal Examination : A+B+C+D	**1,2,3,4,5**	**40**
Semester End Examinations : E	**1,2,3,4,5**	**60**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work	20/09/2021		
I Phase of Instructions	20/09/2021	06/11/2021	7W
I Mid Examinations	08/11/2021	13/11/2021	1W
II Phase of Instructions	15/11/2021	15/01/2022	9W
II Mid Examinations	17/01/2022	22/01/2022	1W
Preparation and Practical	24/01/2022	29/01/2022	2W
Semester End Examinations	31/01/2022	12/02/2022	2W

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, engineeringfundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complexengineering 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 anddesign 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 researchmethods 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 modernengineering 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 sin 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 ofthe 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	**Module Coordinator**	**HOD**
Signature			
Name of the Faculty	**Dr.K.Anupriya**	**Dr. K.Lavanya**	**Dr. B. Srinivasa Rao**

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: **Mr. S. PRAVEEN KUMAR**

Course Name : **SOFTWARE REQUIREMENTS ENGINEERNG** Code: 17CI27

L-T-P Structure : **3-0-0** Credits: **3**

Program/Sem/Sec : **B.Tech.(IT), VII-Sem., Section-A** A.Y: **2021-22**

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. Software Requirements, Karl E. Wiegers, Word Power Publishers, 2000.

T2. Software Requirements and Estimation, Rajesh Naik , Swapna Kishore, TMH

REFERENCE BOOKS:

1. Software Requirements, Karl E. Wiegers, Word Power Publishers, 2000
2. Software Requirements and Estimation, Rajesh Naik , Swapna Kishore, TMH
3. Requirements Engineering: A Good practice Guide, Ian Sommerville, Pete Sawyer, Pearson, 2004.
4. Managing Software Requirements A Use Case Approach, 2/e, Dean, Don , Addision-Wesley, 2003.
5. Requirements Engineering and Rapid Development, Ian Graham, Addision-Wesley, 1998.
6. Mastering the Requirements Process. 2/e, S.Robertson, J.Robertson, Pearson, 2006.
7. https://www.youtube.com/watch?v=h7l6Kl8lafo
8. https://www.vutube.edu.pk/vu-1ectures/.../software-requirement-engineering-cs708
9. freevideo1ectures.com › Computer Science › IIT Bombay
10. https: //nptel.ac.in/courses/106101061/5

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 , Addision-Wesley,2003.
3. Requirements Engineering and Rapid Development, Ian Graham, Addision-Wesley, 1998.
4. Mastering the Requirements Process. 2/e, S.Robertson, J.Robertson, Pearson, 2006.
5. https://www.youtube.com/watch?v=h716Kl8lafo
6. https://www.vutube.edu.pk/vu-lectures/.../software-requirement-engineering-cs708
7. freevideo1ectures.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	27-09-2021	27-09-2021	TLM2	
2.	Requirement Engineering, Requirements Development and Management	1	29-09-2021	29-09-2021	TLM2	
3.	When Bad Requirements happen to Nice People	1	30-09-2021	30-09-2021	TLM2	
4.	Benefits from a High quality requirements process, Characteristics of Excellent Requirements & Functional and Non-functional Requirements	1	1-10-2021	1-10-2021	TLM2	
5.	Good Practices for RequirementsEngineering	1	4-10-2021	4-10-2021	TLM2	
6.	Practical process Improvement,	1	6-10-2021	6-10-2021	TLM2	
7.	Process Maturity	1	7-10-2021	7-10-2021	TLM2	
8.	Requirement Engineering process maturity	1	8-10-2021	8-10-2021	TLM2	
9.	Revision	1	11-10-2021	11-10-2021	TLM2	
No. of classes required to complete UNIT-I: 9				No. of classes taken: 9		

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
1.	Introduction To Requirements Elicitation	1	18-10-2021	18-10-2021	TLM2	
2.	Requirements Elicitation Guidelines	1	20-10-2021	20-10-2021	TLM2	
3.	Requirements Elicitation Techniques	1	21-10-2021	21-10-2021	TLM2	
4.	Requirement Analysis	1	22-10-2021	22-10-2021	TLM2	
5.	Requirement Analysis Models	1	25-10-2021	25-10-2021	TLM2	
6.	Requirement Analysis and Negotiation	1	27-10-2021	27-10-2021	TLM2	
7.	Requirements	1	28-10-2021	28-10-2021	TLM2	

	Documentation					
8.	Characteristics of Software Requirements Specification Document	1	29-10-2021	29-10-2021	TLM2	
9.	Contents of SRS	1	1-10-2021	1-10-2021	TLM2	
10.	Common Problems with SRS	1	3-11-2021	3-11-2021	TLM2	
11.	Common Problems with SRS	1	4-11-2021	4-11-2021	TLM2	
12.	REVISION	1	5-11-2021	5-11-2021	TLM2	
No. of classes required to complete UNIT-II : 12				No. of classes taken:12		

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	15-11-2021	15-11-2021	TLM2	
2.	Requirements Review Challenges, Testing the Requirements	1	17-11-2021	17-11-2021	TLM2	
3.	Defining Acceptance Criteria, Requirement Validation Guidelines.	1	18-11-2021	18-11-2021	TLM2	
4.	Requirements Management	1	19-11-2021	19-11-2021	TLM2	
5.	Requirement Traceability, Database to Manage Requirements	1	22-11-2021	22-11-2021	TLM2	
6.	Change Management Policies	1	24-11-2021	24-11-2021	TLM2	
7.	Requirements Engineering for Critical Systems	1	25-11-2021	25-11-2021	TLM2	
8.	Software Requirements and Risk Management.	1	26-11-2021	26-11-2021	TLM2	
9.	Revision	1	29-11-2021	29-11-2021	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
1.	Introduction to Software Estimation	1	1-12-2021	1-12-2021	TLM2	
2.	Size Estimation	1	2-12-2021	2-12-2021	TLM2	
3.	Two views of Sizing	1	3-12-2021	3-12-2021	TLM2	
4.	Function Point Analysis	1	6-12-2021	6-12-2021	TLM2	
5.	Mark II FPA, Full Function	1	8-12-2021	8-12-2021	TLM2	

	Points					
6.	LOC Estimation	1	9-12-2021	9-12-2021	TLM2	
7.	Conversion between Size Measures	1	10-12-2021	10-12-2021	TLM2	
8.	Revision	1	13-12-2021	13-12-2021	TLM2	
9.	Revision	1	15-12-2021	15-12-2021	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	16-12-2021	16-12-2021	TLM2	
2.	Estimation Factors , Approaches for Effort and Schedule Estimation	1	17-12-2021	17-12-2021	TLM2	
3.	COCOMOII , Putnam Estimation Model, Algorithmic Models	1	20-12-2021	20-12-2021	TLM2	
4.	Cost Estimation	1	22-12-2021	22-12-2021	TLM2	
5.	Introduction to Tools & Desirable Features of Requirements Management Tools	1	23-12-2021	23-12-2021	TLM2	
6.	Some Requirements Management Tools Available	1	24-12-2021	24-12-2021	TLM2	
7.	Rational pro - Desirable Features in Software Estimation Tools	1	27-12-2021	27-12-2021	TLM2	
8.	Some Software Estimation Tools Available	1	29-12-2021	29-12-2021	TLM2	
9.	Revision	1	30-12-2021	30-12-2021	TLM2	
10.	Revision	1	31-12-2021	31-12-2021	TLM2	
No. of classes required to complete UNIT-V : 10				No. of classes taken: 10		

Content Beyond the Syallubus:

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.	Reviewing Research Papers on Software Requirements Engineering	5	17-09-2021	22-09-2021	TLM3	
2.	Taking Demos From Students On Software Requirements	2	23-09-2021	24-09-2021	TLM3	

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 (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):

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.
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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 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.
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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
PSO 3	Develop IT application services with the help of different current engineering tools.

Mr.S.Praveen Kumar	Mr.S.Praveen Kumar	Dr. B. Rama Devi	Dr. B. Srinivasa Rao