



Estd:2001

Sri Indu

College of Engineering & Technology

UGC Autonomous Institution

Recognized under 2(f) & 12(B) of UGC Act 1956,

NAAC, Approved by AICTE &

Permanently Affiliated to JNTUH



NAAC

NATIONAL ASSESSMENT AND
ACCREDITATION COUNCIL



HANDOUT

II Year I Semester

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2022-2023

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

HANDOUT- INDEX

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SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, Affiliated to JNTUH)

Sheriguda (V), Ibrahimpatnam (M), R.R. Dist-501510

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION OF THE INSTITUTE

To be a premier Institution in Engineering & Technology and Management with competency, values and social consciousness

MISSION OF THE INSTITUTE

- IM1:** Provide high quality academic programs, training activities and research facilities.
- IM2:** Promote Continuous Industry-Institute interaction for employability, Entrepreneurship, leadership and research aptitude among stakeholders.
- IM3:** Contribute to the economical and technological development of the region, State and Nation.

VISION OF THE DEPARTMENT

To be a technologically adaptive centre for computing by grooming the students as top notch professionals

MISSION OF THE DEPARTMENT

- DM1:** To offer quality education in computing.
- DM2:** To provide an environment that enables overall development of all the stakeholders.
- DM3:** To impart training on emerging technologies like Data Analytics, Artificial Intelligence and Internet of Things.
- DM4:** To encourage participation of stakeholders in research and development.

PROGRAM EDUCATIONAL OBJECTIVES(PEO'S)

PEO1	Higher Studies: Graduates with an ability to apply knowledge of Basic Sciences and programming skills in their career and higher education.
PEO2	Lifelong Learning: Graduates with an ability to adopt new technologies for ever changing IT industry needs through Self-Study, Critical thinking and Problem solving skills.
PEO3	Professional Skills : Graduates will be ready to work in projects related to complex problems involving multidisciplinary projects with effective analytical skills
PEO4	Engineering citizenship: Graduates with an ability to communicate well and exhibit social, technical and ethical responsibility in process or product.

PROGRAM SPECIFIC OUTCOMES(PSO'S)

Program Specific Outcomes	
PSO 1	To develop software projects using standard practices and suitable programming environment.
PSO 2	To identify, formulate and solve the real life problems faced in the society, industry and other areas by applying the skills of the programming languages, networks and databases learned.
PSO 3	To apply computer science knowledge in exploring and adopting latest technologies in various inter-disciplinary research activities.

PROGRAM OUTCOMES(PO'S)

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design / Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSE OUTCOMES (CO's)

Academic Year: 2022-23

Class: II YEAR-I SEM.

Course Name: Object Oriented Programming using C++ (R20CSE2103)

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

Course Outcomes	Statements
C213.1	Distinguish the Procedural and object oriented paradigm along with principles. (Analyzing)
C213.2	Understand dynamic memory management techniques using pointers, constructors, destructors, etc. (Understanding)
C213.3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. (Understanding)
C213.4	Classify Inheritance with the understanding of early and late Binding. (Understanding)
C213.5	Illustrate the process of data file manipulations using C++. (Applying)
C213.6	An ability to incorporate Exception Handling and Benefits of Exception handling in Object Oriented Programs. (Analyzing)

Mapping of Course Outcomes(CO's) with PO's:

CO	PO											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C213.1	3	2	3	3	1	-	-	-	-	-	-	1
C213.2	3	3	3	3	-	-	-	-	-	-	-	1
C213.3	3	3	3	3	-	-	-	-	-	-	-	1
C213.4	3	2	3	2	-	-	-	-	-	-	-	1
C213.5	3	3	3	3	-	-	-	-	-	-	-	2
C213.6	3	3	3	3	-	-	-	-	-	-	-	1
C213	3	2.6	3	2.6	-	-	-	-	-	-	-	1.5

3: High 2: Medium 1: Low

Mapping of Course Outcomes(CO's) with PSO's:

COs	PSO1	PSO2	PSO3
C213.1	3	3	1
C213.2	3	3	3
C213.3	3	3	2
C213.4	3	3	3
C213.5	3	3	2
C213.6	3	3	-
	3	3	3



LR.NO.SICET/AUTO/DAE/BR-20/ACADEMIC-CAL/520/2022

DATE: 05.09.2022

II B.TECH ACADEMIC CALENDAR
ACADEMIC YEAR : 2022-2023

Dr. G. SURESH,
Principal,
To,
All the HODs.
Sir,

Red

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for
II B.Tech - I & II Semester for the academic year **2022-23** – Reg.

The approved Academic Calendar for **II B.Tech – I & II Semester** for the academic
Year **2022-23** is given below:

ACADEMIC CALENDAR - II B.TECH - I & II SEMESTER
ADMITTED BATCH – (2021 – 2022) of BR-20 Regulation.

I SEMESTER

Commencement of I Sem class work	26.09.2022	
I Spell of Instructions (Including Dussehra Holidays).	26.09.2022 - 26.11.2022	9 Weeks
Dussehra Holidays.	03.10.2022 - 08.10.2022	1 Week
I Mid Examinations for II B.Tech I Sem Students.	28.11.2022 - 30.11.2022	3 Days
II Spell of Instructions.	01.12.2022 - 28.01.2023	8 Weeks 3 Days
Sankranti Holidays.	13.01.2023 - 16.01.2023	4 Days
II Mid Examinations for II B.Tech I Sem Students.	30.01.2023 - 01.02.2023	3 Days
Preparation Holidays, Practical Lab Examinations and Remedial Mid Test (RMT).	02.02.2023 - 11.02.2023	10 Days
II B.Tech I Semester End Examinations (Main) and Supplementary Examinations.	13.02.2023 - 25.02.2023	2 Weeks
Commencement of Class-Work for II B.Tech - II Semester 27.02.2023 (Monday).		

II SEMESTER

Commencement of II Sem class work.	27.02.2023	
I Spell of Instructions.	27.02.2023 - 22.04.2023	8 Weeks
I Mid Examinations for II B.Tech. II Sem. Students.	24.04.2023 - 26.04.2023	3 Days
II Spell of Instructions.	27.04.2023 - 05.07.2023	10 Weeks
Summer Vacation.	15.05.2023 - 27.05.2023	2 Weeks
II Mid Examinations for II B.Tech. II Sem. Students.	06.07.2023 - 08.07.2023	3 Days
Preparation Holidays, Practical Lab Examinations Remedial Mid Test (RMT).	10.07.2023 - 19.07.2023	10 Days
II B.Tech II Semester End Examinations (Main) and Supplementary Examinations.	20.07.2023 - 02.08.2023	2 Weeks
Commencement of Class-Work for III B.Tech - I Semester 07.08.2023 (Monday).		

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SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
DEPARTMENT Academic CALENDAR – 2022-2023 (SEMESTER-1)

DAYS			NOVEMBER '22				DECEMBER '22				FEBRUARY '23		
SUNDAY			1										
MONDAY			2								1 MID EXAM-II		
TUESDAY	SEPTEMBER '22		3								2 PRACTICAL EXAM		
WEDNESDAY			4								3 PRACTICAL EXAM		
THURSDAY	1		OCTOBER '22		4						4 PRACTICAL EXAM		
FRIDAY	2		1	Bathukamma Celebrations	5		3		JANUARY '23		4 PRACTICAL EXAM		
SATURDAY	3		2	Gandhi Jayanti/ HOLIDAY	6	HOLIDAY	4	HOLIDAY	1	NEW YEAR/ HOLIDAY		5	HOLIDAY
SUNDAY	4	HOLIDAY	3	DASARA HOLIDAYS	7		5		2			6	PRACTICAL EXAM
MONDAY	5		4	DASARA HOLIDAYS	8	GURUNANAK JAYANTHI	6		3			7	PRACTICAL EXAM
TUESDAY	6		5	DASARA HOLIDAYS	9		7		4			8	PRACTICAL EXAM
WEDNESDAY	7		6	DASARA HOLIDAYS	10		8		5			9	PRACTICAL EXAM
THURSDAY	8		7	DASARA HOLIDAYS	11		9		6			10	PRACTICAL EXAM
FRIDAY	9	Ganesh Nimajanam	8	DASARA HOLIDAYS	12		10		7			11	PRACTICAL EXAM
SATURDAY	10		9	HOLIDAY	13	HOLIDAY	11	HOLIDAY	8	HOLIDAY		12	HOLIDAY
SUNDAY	11	HOLIDAY	10		14		12		9			13	END EXAM
MONDAY	12		11		15		13		10			14	END EXAM
TUESDAY	13		12		16		14		11			15	END EXAM
WEDNESDAY	14		13		17		15		12			16	END EXAM
THURSDAY	15		14		18		16		13	BHOGI		17	END EXAM
FRIDAY	16		15		19		17		14	SANKRANTHI		18	END EXAM
SATURDAY	17	Telangana vimochana dinostavam	16	HOLIDAY	20	HOLIDAY	18	HOLIDAY	15	HOLIDAY		19	HOLIDAY
SUNDAY	18	HOLIDAY	17		21		19		16	HOLIDAY		20	END EXAM
MONDAY	19		18		22		20		17			21	END EXAM
TUESDAY	20		19		23		21		18			22	END EXAM
WEDNESDAY	21		20		24		22		19			23	END EXAM
THURSDAY	22		21		25		23		20			24	END EXAM
FRIDAY	23		22		26		24		21			25	END EXAM
SATURDAY	24		23	HOLIDAY	27	HOLIDAY	25	CHRISTMAS/ HOLIDAY	22	HOLIDAY		26	
SUNDAY	25	HOLIDAY	24		28	MID EXAM-I	26	BOXING DAY/ HOLIDAY	23			27	
MONDAY	26	Commencement of Classes (II Yr)	25	DIWALI	29	MID EXAM-I	27		24			28	
TUESDAY	27		26		30	MID EXAM-I	28		25			29	

WEDNESDAY	28	27		29	26	Republic Day
THURSDAY	29	28		30	27	
FRIDAY	30	29		31	28	
SATURDAY		30			29	HOLIDAY
SUNDAY		31			30	MID EXAM-II
MONDAY					31	MID EXAM-II

CALENDAR INCHARGE

**HOD/CSE
DEAN**

PRINCIPAL

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech - II Year – I Semester

L	T	P	C
2	0	0	2

(R20CSE2103) Object Oriented Programming using C++

Course Objectives:

- Introduces Object Oriented Programming concepts using the C++ language.
- Introduces the principles of data abstraction, inheritance and polymorphism;
- Introduces the principles of virtual functions and polymorphism
- Introduces handling formatted I/O and unformatted I/O
- Introduces exception handling

Course Outcomes:

- Define and identify the different types of data structures implementation in object oriented programming through C++.
- Describe the basic concept of Object Oriented Programming and can able to differentiate different data structures.
- Classify the data structure type based on the given data and Examine the problem using classes and Templates.
- Choose appropriate searching and sorting technique for given problem.
- Select required data structure and evaluate and justify the given graph problems.

- Formulate the concept of Text pattern matching techniques.

UNIT - I

Object-Oriented Thinking: Different paradigms for problem solving, need for OOP paradigm, differences between OOP and Procedure oriented programming, Overview of OOP concepts- Abstraction, Encapsulation, Inheritance and Polymorphism.

C++ Basics: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings, Structures, References. Flow control statement- if, switch, while, for, do, break, continue, goto statements. Functions - Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions. Dynamic memory allocation and de-allocation operators-new and delete, Preprocessor directives.

UNIT - II

C++ Classes and Data Abstraction: Class definition, Class structure, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors, Dynamic creation and destruction of objects, Data abstraction, ADT and information hiding.

UNIT - III

Inheritance: Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction, Destructors, Virtual base class.

Virtual Functions and Polymorphism: Static and Dynamic binding, virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes, Implications of polymorphic use of classes, Virtual destructors.

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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B.Tech - II Year – I Semester

L	T	P	C
2	0	0	2


(R20CSE2103) Object Oriented Programming using C++

UNIT - IV

C++ I/O: I/O using C functions, Stream classes hierarchy, Stream I/O, File streams and String streams, Overloading operators, Error handling during file operations, Formatted I/O.

UNIT - V


Exception Handling: Benefits of exception handling, Throwing an exception, The try block, Catching an exception, Exception objects, Exception specifications, Stack unwinding, Rethrowing an exception, Catching all exceptions.

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	LESSON PLAN Department of Computer Science and Engineering			
	Sub. Code & Title		(R20CSE2103) Object Oriented Programming using C++	
	Academic Year:2021-2022		Year/Sem/Section	II/I/A&B&C&D
	Faculty Name & Designation		1. K.KRISHNA ASST.PROF 2. G MANASA Asst.prof	

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			From	To				
UNIT-I								
I	Introduction: Object Oriented using C++ basics					19		
1.1	Introduction to Object Oriented Paradigms C++	T1	1	5	Black board	1		CO1,K4
1.2	Differenced between OOP & Procedure Oriented Programming With Program	T1	6	8	Black board	2		CO1,K4
1.3	Overview of OOP Concepts	T1	9	15	Black board	2		CO1,K4
1.4	Structure of C++ Program, Data types	T1	16	18	Black board	2		CO1,K4
1.5	Declaration of Variables, Expression Operators	T1	19	21	Black board	1		CO1,K4
1.6	Operator Precedence, Evaluation of expressions with examples	T1	23	28	Black board	1		CO1,K4
1.7	Introduction to Pointers with Example	T1	29	32	Black board	1		CO1,K4
1.8	Type Conversion, Arrays, Pointers & Arrays, Strings structures, References	T1	33	35	Black board	2		CO1,K4
1.9	Flow Control Statement-if, switch, while, for, do, break, continue, goto statements with their syntax	T1	38	45	https://nptel.ac.in/courses/106/101/106101208/	2		CO1,K4

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
UNIT –III								
III	Inheritance					17		
3.1	Introduction to inheritance and their types	T1	130	134	Black board	2		CO4,K2
3.2	Defining a class Hierarchy, different forms of inheritance	T1	135	142	Black board	1		CO4,K2
3.3	Defining the base and derived classes, base and derived class construction	T2	143	153	Black board	1		CO4,K2
3.4	Accessing to the base class members, destructors	T2	154	162	Black board	2		CO4,K2
3.5	Virtual base class	R1	165	172	Black board	1		CO3,K2
3.6	Introduction to Polymorphism and virtual Functions	T1	174	182	Black board	2		CO3,K2
3.7	Static and dynamic Binding and virtual functions with examples	T1	183	195	Black board	2		CO3,K2
3.8	Dynamic Binding through virtual functions	T2	196	202	Black board	1		CO3,K2
3.9	Virtual Function call mechanism and pure virtual functions	T2	204	209	Black board	1		CO3,K2
3.10	Introduction to Abstract classes with example	T2	211	218	Black board	2		CO3,K2
3.11	Implications of Polymorphic use of classes	T1	221	229	Black board	1		CO3,K2
3.12	Virtual Destructors	R2	232	242	Black board	1		CO3,K2
	Review	Signature of the HOD/Coordinator						
Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
UNIT - IV								
IV	C++ I/O					14		
4.1	Introduction to C++ I/O using C Functions with example	T1	246	252	Black board			CO5,K3
4.2	Introduction to Stream I/O	T1	256	264	Black board			CO5,K3
4.3	Stream classes Hierarchy	T2	268	276	PPT			CO5,K3
4.4	File streams and string streams	T2	277	285	Black board			CO5,K3
4.5	Overloading Operators	R1	286	292	Black board			CO3,K2
4.6	Error Handling during the file operations with example	T1	293	299	Black board			CO5,K3
4.7	Formatted I/O	T2	302	305	Black board			CO5,K3
	Review	Signature of the HOD/Coordinator						

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
UNIT - V								
V	Exception Handling					09		
5.1	Introduction to Exception Handling and their Benefits	T1	307	315	Black board	1		CO6,K4
5.2	Throwing and exception, try block with example	T2	316	322	Black board	2		CO6,K4
5.3	Catching an Exception	T1	323	334	Black board	1		CO6,K4
5.4	Exception Objects	T2	335	342	PPT	1		CO6,K4
5.5	Exception Specifications	T1	343	352	Black board	1		CO6,K4
5.6	Stack Unwinding	T2	354	359	Black board	1		CO6,K4
5.7	Re throwing an exception	T1	362	373	Black board	1		CO6,K4
5.8	Catching all exceptions with example	T2	374	394	Black board	1		CO6,K4
	Review	Signature of the HOD/Coordinator						

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	(Regulation :R20) Department of Computer Science and Engineering		
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	Academic Year: 2021-22	Year/Sem/Section	II/I/A&B&C&D
	Faculty Name & Designation	1. K. KRISHNA ASST.PROF 2. G MANASA ASST.PROF	


LIST OF TEXT BOOKS AND REFERENCES

TEXT BOOKS:

1. The Complete Reference C++, 4th Edition, Herbert Schildt, Tata McGraw Hill.
2. Problem solving with C++: The Object of Programming, 4th Edition, Walter Savitch, Pearson Education.

REFERENCE BOOKS:

1. The C++ Programming Language, 3rd Edition, B. Stroutstrup, Pearson Education.
2. OOP in C++, 3rd Edition, T. Gaddis, J. Walters and G. Muganda, Wiley Dream Tech Press.
3. Object Oriented Programming in C++, 3rd Edition, R. Lafore, Galigotia Publications Pvt Ltd.

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	(Regulation :R20) Department of Computer Science and Engineering			
	Sub. Code & Title	(R20CSE2103) Object Oriented Programming using C++		
	Academic Year: 2021-22	Year/Sem/Section	II/I/A&B&C&D	
	Faculty Name & Designation	1. K.KRISHNA ASST.PROF 2. G . MANASA ASST.PROF		

CONTENT BEYOND THE SYLLABUS


S. No	Topics	Proposed Actions	Date	Resource Person/Mode	POs	PSOs
1	Templates	To get knowledge		A.SUDHEER	PO1	PSO1,PSO2
2	C++ vs Python	To get knowledge		A.SUDHEER	PO1	PSO1,PSO2

ASSIGNMENT

SL.No	Assignment Questions	Course Outcome	Books To be Referred	Date of Announcement	Date Of Submission
1	Compare procedural and Object oriented programming paradigm with suitable examples. (Analyzing)	CO1	T1		
2	Explain the basic concepts of object oriented programming.(Understanding)	CO1	T1		
3	Explain in details about classes and objects in C++. (Understanding)	CO1	T1		
4	Classify the different types of constructor used in C++. (Understanding)	CO2	T1		
5	Classify the different types of inheritance used in C++. (Understanding)	CO4	T2		

6	Write a C++ program to demonstrate the concept of virtual function.(Applying)	CO3	R1		
7	With a neat diagram, explain in details about the hierarchical structure of stream classes. (Understanding)	CO5	T1		
8	Explain in details about operator overloading with examples. (Understanding)	CO3	T1		
9	Explain in detail about exception handling in C++ with examples. (Understanding)	CO6	T1		
10	Write shot notes on i) try ii) throw iii) catch (Understanding)	CO6	T1		

Object Oriented Programming using C++
(Subject Code: R20CSE2103)

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	(Regulation :R20) Department of Computer Science and Engineering		
	Sub. Code & Title	(R20CSE2103) Object Oriented Programming using C++	
	Academic Year: 2021-22	Year/Sem/Section	II/I/A&B&C&D
	Faculty Name & Designation	1. K.KRISHNA ASST.PROF 2. G MANASA	

QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)

(1. Remembering 2. Understanding 3. Applying 4. Analyzing 5. Evaluating 6. Creating)

UNIT- I Introduction: Object Oriented using C++ Basics				
1 MARK QUESTIONS			BT Level	Course Outcome
1	Define Abstraction.		1	CO1
2	Define Encapsulation.		2	CO1
3	List the benefits of Inheritance.		1	CO1
4	List the data types used in C++		1	CO1
5	Mention the use of an Array		2	CO1
6	Differentiate structure and class .		4	CO1
7	State the properties of explicit conversion.		2	CO1
8	Define Recursion.		1	CO1
9	Mention the use of new and delete operator in dynamic memory allocation.		1	CO2
10	Define pointer.		1	CO1
10 MARK QUESTIONS			BT Level	Course Outcome
1	Compare procedural and Object oriented programming paradigm with suitable examples.		4	CO1
2	Explain the basic concepts of object oriented programming.		2	CO1
3	With a suitable example, explain the basic structure of C++ programming.		2	CO1
4	Summarize the different types of operators used in C++.		2	CO1
5	Write a C++ program to find the factorial of the given number using recursive function.		3	CO1
6	Explain in detail about the control statements with suitable examples.		2	CO1

7	Write a C++ program to swap two numbers using call by reference.	3	CO1
8	Explain the different types of user defined functions with suitable examples.	2	CO1
9	Write a C++ program to declare struct. Initialize and display contents of member variables.	3	CO1
10	Classify the different data types supported by C++ programming.	2	CO1

UNIT- II C++ Classes and Data Abstraction

1 MARK QUESTIONS

		BT Level	Course Outcome
1	Define Class	1	CO1
2	Define Object.	1	CO1
3	State the properties 'this' keyword.	2	CO1
4	Mention the use of scope resolution operator for member function definition in a class.	2	CO3
5	Define Constructor.	1	CO2
6	Define Destructor.	1	CO2
7	List the types of Constructors.	1	CO2
8	State the properties of static variable.	2	CO1
9	Mention the use of static function.	2	CO2
10	List the three types of access specifiers.	1	CO1

10 MARK QUESTIONS

		BT Level	Course Outcome
1	Explain in details about classes and objects in C++.	2	CO1
2	Write a C++ program to demonstrate the concept of class definition.	3	CO1
3	Write a C++ program to display Names, Roll No and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No and grade. Create an array of class objects. Read and display the contents of array.	6	CO1
4	Classify the different types of constructor used in C++.	2	CO2
5	Compare default and parameterized constructor with an example.	4	CO2
6	With suitable examples, illustrate the concept of copy constructor.	3	CO2
7	Compare constructors and member functions.	4	CO2
8	Explain in details about the uses of friend function with examples.	2	CO2

9	Illustrate how the static variables are used in static function.	3	CO2
10	Create a class to represent a bank account. Include the following members: Name of the depositor, Account number, Balance amount in the account and member functions are i) To deposit an amount, ii) To withdraw an amount after checking the balance, iii) To display name and balance.	6	CO2

UNIT- III Inheritance

1 MARK QUESTIONS

		BT Level	Course Outcome
1	Define Inheritance.	1	CO4
2	List the types of Inheritance	1	CO4
3	Differentiate base classes and derived Classes.	4	CO4
4	Differentiate single and multiple inheritances.	4	CO4
5	Define Virtual functions.	1	CO3
6	What is Pure Virtual function	2	CO3
7	What is Abstract class	2	CO3
8	Write the syntax to define derived class.	2	CO3
9	Define runtime polymorphism	1	CO3
10	Differentiate static and dynamic binding	4	CO4

10 MARK QUESTIONS

		BT Level	Course Outcome
1	Classify the different types of inheritance used in C++.	2	CO4
2	With suitable examples , demonstrate the concept of multiple inheritance .	3	CO4
3	Illustrate the concept multilevel inheritance with suitable examples.	3	CO4
4	What is the ambiguity of multiple inheritances? Explain with examples.	2	CO4
5	Write a C++ program to demonstrate the use of the pure virtual function .	3	CO3
6	Compare virtual function and pure virtual function with appropriate examples.	4	CO3
7	Write a C++ program to demonstrate the concept of virtual function.	3	CO3
8	Explain in detail about function overriding with suitable examples.	2	CO3
9	Compare function overloading and function overriding.	4	CO3
10	Write a program to generate student result using three classes namely student, mark and result using multi-level inheritance.	6	CO4

UNIT- IV C++ I/O

1 MARK QUESTIONS		BT Level	Course Outcome
1	Draw a hierarchical structure of Stream Classes. (Understanding)	2	CO5
2	List any two formatted I/O functions used in C++. (Remembering)	1	CO5
3	Define manipulators. (Remembering)	1	CO5
4	Define input stream. (Remembering)	1	CO5
5	Define output stream.(Remembering)	1	CO5
6	Differentiate input stream and output stream.(Analyzing)	4	CO5
7	Define operator overloading (Remembering)	1	CO3
8	List the operators that cannot be overloaded. (Remembering)	1	CO3
9	Why is it necessary to include the iostream class in all programs? (Analyzing)	4	CO5
10	Mention the use of eof () in file handling operation. (Understanding)	2	CO5
10 MARK QUESTIONS		BT Level	Course Outcome
1	With a neat diagram, explain in details about the hierarchical structure of stream classes.	2	CO5
2	Compare formatted and Unformatted IO with suitable examples	4	CO5
3	Explain in details about operator overloading with examples.	2	CO3
4	Demonstrate the concept of unary operator overloading with examples.	3	CO3
5	Write a C++ program to illustrate the overload of increment and decrement operators.	3	CO3
6	Illustrate the concept of binary operator overloading with suitable examples.	3	CO3
7	Develop a program to sum of two complex numbers using binary operator overloading.	6	CO3
8	Summarize the steps in involved in file handling operations.	2	CO5
9	Write a C++ program to store the information of a Student using file concept.	6	CO5
10	Classify the different types of file pointers in C++ with suitable examples.	2	CO5
UNIT- V Exception Handling			
1 MARK QUESTIONS		BT Level	Course Outcome
1	Define exception	1	CO6
2	List any two advantages of exception handling.	2	CO6
3	Define multiple catch statements.	1	CO6
4	List the three keywords used in exception handling.	1	CO6

5	Write the syntax to define catch block.	2	CO6
6	State the properties of try block.	2	CO6
7	Mention the use of catch block.	2	CO6
8	Define re-throwing an Exception	1	CO6
9	What is the importance of catch all?	2	CO6
10	What is Uncaught Exception?	2	CO6
10 MARK QUESTIONS		BT Level	Course Outcome
1	Explain in detail about exception handling in C++ with examples.	2	CO6
2	Write a C++ program to demonstrate the concept of multiple catch statements.	3	CO6
3	Create a C++ program for handling divide-by-zero exception.	3	CO6
4	Illustrate the need of re-throw an exception with suitable examples.	3	CO6
5	Write shot notes on i) try ii) throw iii) catch	2	CO6
6	Summarize the standard exceptions occurs in C++.	2	CO6
7	Explain in details about the benefits of exception handling in C++.	2	CO6
8	With suitable examples, illustrate the concept of “catch all”.	3	CO6
9	Explain in details about stack unwinding with an appropriate example.	2	CO6
10	Summarize the implementation of exception specifications in C++.	2	CO6

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

Recognized under 2(f) and 12(B) of UGC Act 1956

II B.Tech – I Semester – (Regular) End Examinations - November - 2019**OBJECT ORIENTED PROGRAMMING USING C++**

(Common to CSE, IT)

Duration: 3 Hrs**14.11.2019****Max Marks: 70M****Section - A****Answer All the following questions****Marks: 5Qx4M = 20M**

1. Compare the features of object oriented programming with procedure oriented programming.
2. What is abstract class? Explain its use in object oriented programming.
3. Using a table explain different access specifier and their scope and visibility in inheritance.
4. Analyze the inheritance structure of ios, ostream, istream and iostream classes and the problem involved in this inheritance structure.
5. Defend that exception handling can save a program from error input.

Section - B**Answer any FIVE questions choosing at least one from each Unit****Marks: 5Qx10M = 50M****UNIT : I**

6. Explain object oriented concepts in detail.

(OR)

7. a) Explain operator precedence with its impact in expression evaluation.
- b) Explain inline function. Show the impact of inline function in a C++ program.

UNIT : II

8. a) Create a program which contains a Number class with an integer member variable, member functions read(), display() and min(). min() function takes Number class objects as parameter and returns a Number class object with minimum value of integer member among the current object and the parameter object. Use all the functions in main program.
- b) Explain static member variables and static member functions.

(OR)

9. a) Create program in which the private member of a class is accessed by functions in another class.
- b) Explain the dynamic creation and destruction of objects.

UNIT : III

10. a) Illustrate the access to the base class members in multilevel inheritance.
- b) Compare static and dynamic binding.

(OR)

11. Explain different forms of inheritance with simple examples.

UNIT : IV

12. a) Construct a program with five kinds of formatted output.
- b) Analyze operator overloading using different methods.

(OR)**P.T.O**

13. a) Model a program with string streams on Student class.

b) Compare I/O with C functions and formatted I/O.

UNIT : V

14. a) Apply multiple exception handling in a program.

b) Outline the role of keywords try, catch and throw in exception handling.

(OR)

15. a) Compare a program with exception handling and without exception handling using example.

b) Demonstrate re-throwing an exception using a simple program.

BR-18

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

D4

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)

II B.Tech - I Semester - I Mid Term Examinations, August - 2019

(R18CSE2103) OBJECT ORIENTED PROGRAMMING USING C++ - (Common to CSE & IT)

Duration: 90Mins

Dt: 28.08.2019 FN

Max Marks: 25M

Section – A

Answer All the questions

Marks: 5Qx1M = 5M

1. Define Abstraction.
2. Define Recursion.
3. Define Class.
4. List the three types of access specifiers.
5. Define Inheritance.

Section – B

Answer any FOUR questions

Marks: 4Qx5M = 20M

6. Explain the basic concepts of object oriented programming.
7. Explain in detail about the control statements with suitable examples.
8. Write a C++ program to display Names, Roll No and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No and grade. Create an array of class objects. Read and display the contents of array.
9. Classify the different types of constructor used in C++.
10. With suitable examples, demonstrate the concept of multiple inheritance.
11. Illustrate the concept multilevel inheritance with suitable examples.

S

BR-18

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

D4

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)

II B.Tech - I Semester - I Mid Term Examinations, August - 2019

(R18CSE2103) OBJECT ORIENTED PROGRAMMING USING C++ - (Common to CSE & IT)

Duration: 90Mins

Dt: 28.08.2019 FN

Max Marks: 25M

Section – A

Answer All the questions

Marks: 5Qx1M = 5M

1. Define Abstraction.
2. Define Recursion.
3. Define Class.
4. List the three types of access specifiers.
5. Define Inheritance.

Section – B

Answer any FOUR questions

Marks: 4Qx5M = 20M

6. Explain the basic concepts of object oriented programming.
7. Explain in detail about the control statements with suitable examples.
8. Write a C++ program to display Names, Roll No and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No and grade. Create an array of class objects. Read and display the contents of array.
9. Classify the different types of constructor used in C++.
10. With suitable examples, demonstrate the concept of multiple inheritance.
11. Illustrate the concept multilevel inheritance with suitable examples.



Estd.2001

Sri Indu

College of Engineering & Technology

UGC Autonomous Institution

Recognized under 2(f) & 12(B) of UGC Act 1956,

NAAC, Approved by AICTE &

Permanently Affiliated to JNTUH



NAAC

NATIONAL ASSESSMENT AND
ACCREDITATION COUNCIL



HANDOUT

II Year CSE- Semester I

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2022-23



SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

(Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi and Accredited by NBA, NAAC)
Sheriguda Village, Ibrahimpatnam Mandal, Ranga Reddy Dist. – 501 510

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

HANDOUT- INDEX

S. No	Contents
1	Vision, Mission, PEOs, PSOs, POs & Cos
2	Institution Academic Calendar
3	Department Academic Calendar
4	Subject wise
i)	Syllabus Copy
ii)	Lesson Plan
iii)	Question Bank
iv)	End Examination Questions (Previous 3 Academic Year)
v)	Mid-1 & Mid-2 Questions (Previous 3 Academic Year)
vi)	AE Hand written Notes



SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

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INSTITUTION VISION

To evolve into a center of excellence in Science and Technology through creative and innovative practices in teaching & learning, towards promotion of academic achievement & research excellence to produce globally accepted, competitive and world class professionals, who are psychologically strong and emotionally balanced, imbued with social consciousness and ethical values.

INSTITUTION MISSION

To provide high quality academic programmes, training activities, research facilities and opportunities supported by continuous industry-institute interaction aimed at promoting employability, entrepreneurship, leadership and research aptitude among students and contribute to the economic and technological development of the region, state and Nation.

PRINCIPAL



SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

**(Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi and Accredited by NBA, NAAC)
Sheriguda Village, Ibrahimpatnam Mandal, Ranga Reddy Dist. – 501 510**

VISION OF THE DEPARTMENT

To be a technologically adaptive centre for computing by grooming the students as top notch professionals.

MISSION OF THE DEPARTMENT

DM₁: To offer quality education in computing.

DM₂: To provide an environment that enables overall development of all the stakeholders.

DM₃: To impart training on emerging technologies like Data Analytics, Artificial Intelligence and Internet Of Things.

DM₄: To encourage participation of stakeholders in research and development

Program Educational Objectives(PEO's)

PEO1	Higher Studies : Graduates with an ability to apply knowledge of Basic Sciences and programming skills in their career and higher education.
PEO2	Lifelong Learning: Graduates with an ability to adopt new technologies for ever changing IT industry needs through Self-Study, Critical thinking and Problem solving skills.
PEO3	Professional Skills : Graduates will be ready to work in projects related to complex problems involving multidisciplinary projects with effective analytical skills
PEO4	Engineering citizenship: Graduates with an ability to communicate well and exhibit social,technical and ethical responsibility in process or product.

Program Specific Outcomes(PSO's)

PSO1	Software Development: To apply the knowledge of Software Engineering, Data Communication, Web Technology and Operating Systems for building IOT and Cloud Computing applications.
PSO2	Industrial Skills Ability: Design, develop and test software systems for world-wide network of computers to provide solutions to real world problems.
PSO3	Project Implementation: Analyze and recommend the appropriate IT infrastructure required for the implementation of a project.

Program Outcomes(PO's)

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design / Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

ACADEMIC CALENDAR 2022-2023



SAI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)
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NBA Accredited, Approved by AICTE and Permanently affiliated to JNTUH
Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

D4

BR-20

LR.NO.SICET/AUTO/DAE/BR-20/ACADEMIC-CAL/520/2022

DATE: 05.09.2022

II B.TECH ACADEMIC CALENDAR ACADEMIC YEAR : 2022-2023

Dr. G. SURESH,
Principal,
To,
All the HODs.
Sir,

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for
II B.Tech - I & II Semester for the academic year **2022-23** – Reg.

The approved Academic Calendar for **II B.Tech – I & II Semester** for the academic
Year **2022-23** is given below:

ACADEMIC CALENDAR - II B.TECH - I & II SEMESTER ADMITTED BATCH – (2021 – 2022) of BR-20 Regulation.

I SEMESTER

Commencement of I Sem class work	26.09.2022	
I Spell of Instructions (Including Dussehra Holidays).	26.09.2022 - 26.11.2022	9 Weeks
Dussehra Holidays.	03.10.2022 - 08.10.2022	1 Week
I Mid Examinations for II B.Tech I Sem Students.	28.11.2022 - 30.11.2022	3 Days
II Spell of Instructions.	01.12.2022 - 28.01.2023	8 Weeks 3 Days
Sankranti Holidays.	13.01.2023 - 16.01.2023	4 Days
II Mid Examinations for II B.Tech I Sem Students.	30.01.2023 - 01.02.2023	3 Days
Preparation Holidays, Practical Lab Examinations and Remedial Mid Test (RMT).	02.02.2023 - 11.02.2023	10 Days
II B.Tech I Semester End Examinations (Main) and Supplementary Examinations.	13.02.2023 - 25.02.2023	2 Weeks
Commencement of Class-Work for II B.Tech - II Semester 27.02.2023 (Monday).		

II SEMESTER

Commencement of II Sem class work.	27.02.2023	
I Spell of Instructions.	27.02.2023 - 22.04.2023	8 Weeks
I Mid Examinations for II B.Tech. II Sem. Students.	24.04.2023 - 26.04.2023	3 Days
II Spell of Instructions.	27.04.2023 - 05.07.2023	10 Weeks
Summer Vacation.	15.05.2023 - 27.05.2023	2 Weeks
II Mid Examinations for II B.Tech. II Sem. Students.	06.07.2023 - 08.07.2023	3 Days
Preparation Holidays, Practical Lab Examinations Remedial Mid Test (RMT).	10.07.2023 - 19.07.2023	10 Days
II B.Tech II Semester End Examinations (Main) and Supplementary Examinations.	20.07.2023 - 02.08.2023	2 Weeks
Commencement of Class-Work for III B.Tech - I Semester 07.08.2023 (Monday).		

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
DEPARTMENT Academic CALENDAR – 2022-2023 (SEMESTER-1)

DAYS												
SUNDAY				NOVEMBER '22								
MONDAY				1		DECEMBER '22			FEBRUARY'23			
TUESDAY	SEPTEMBER'22 2			2					1	MID EXAM-II		
WEDNESDAY				3		1			2	PRACTICAL EXAM		
THURSDAY	1			OCTOBER '22		4		2	3	PRACTICAL EXAM		
FRIDAY	2		1	Bathukamma Celebrations	5		3		JANUARY'23			
SATURDAY	3		2	Gandhi Jayanti/HOLIDAY	6	HOLIDAY	4	HOLIDAY	1	NEW YEAR/HOLIDAY	5	HOLIDAY
SUNDAY	4	HOLIDAY	3	DASARA HOLIDAYS	7		5		2		6	PRACTICAL EXAM
MONDAY	5		4	DASARA HOLIDAYS	8	GURUNANAK JAYANTHI	6		3		7	PRACTICAL EXAM
TUESDAY	6		5	DASARA HOLIDAYS	9		7		4		8	PRACTICAL EXAM
WEDNESDAY	7		6	DASARA HOLIDAYS	10		8		5		9	PRACTICAL EXAM
THURSDAY	8		7	DASARA HOLIDAYS	11		9		6		10	PRACTICAL EXAM
FRIDAY	9	Ganesh Nimajanam	8	DASARA HOLIDAYS	12		10		7		11	PRACTICAL EXAM
SATURDAY	10		9	HOLIDAY	13	HOLIDAY	11	HOLIDAY	8	HOLIDAY	12	HOLIDAY
SUNDAY	11	HOLIDAY	10		14		12		9		13	END EXAM
MONDAY	12		11		15		13		10		14	END EXAM
TUESDAY	13		12		16		14		11		15	END EXAM
WEDNESDAY	14		13		17		15		12		16	END EXAM
THURSDAY	15		14		18		16		13	BHOGI	17	END EXAM
FRIDAY	16		15		19		17		14	SANKRANTHI	18	END EXAM
SATURDAY	17	Telangana vimochna dinostavam	16	HOLIDAY	20	HOLIDAY	18	HOLIDAY	15	HOLIDAY	19	HOLIDAY
SUNDAY	18	HOLIDAY	17		21		19		16	HOLIDAY	20	END EXAM
MONDAY	19		18		22		20		17		21	END EXAM
TUESDAY	20		19		23		21		18		22	END EXAM
WEDNESDAY	21		20		24		22		19		23	END EXAM
THURSDAY	22		21		25		23		20		24	END EXAM
FRIDAY	23		22		26		24		21		25	END EXAM
SATURDAY	24		23	HOLIDAY	27	HOLIDAY	25	CHRISTMAS/HOLIDAY	22	HOLIDAY	26	
SUNDAY	25	HOLIDAY	24		28	MID EXAM-I	26	BOXING DAY/HOLIDAY	23		27	

MONDAY	26	Commencement of Classes (II Yr)	25	DIWALI	29	MID EXAM-I	27		24		28
TUESDAY	27		26		30	MID EXAM-I	28		25		29
WEDNESDAY	28		27				29		26	Republic Day	
THURSDAY	29		28				30		27		
FRIDAY	30		29				31		28		
SATURDAY			30						29	HOLIDAY	
SUNDAY			31						30	MID EXAM-II	
MONDAY									31	MID EXAM-II	

CALENDAR INCHARGE

HOD/DEAN(CSE)

PRINCIPAL

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech. - II Year – I Semester

L T P C
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(R20ECE2105) Analog Electronics

Objectives:

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET transistors and amplifier circuits.
- To understand diode as rectifier.
- To study basic principle of filter circuits and various types.

UNIT -I:

P-N Junction Diode: Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

Special Purpose Electronic Devices: Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

UNIT-II:

Rectifiers and Filters : The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, π - Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

UNIT-III:

Bipolar Junction Transistor and UJT: The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications, BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

UNIT-IV:

Transistor Biasing and Stabilization: Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector – Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in V_{BE} and β , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis Transistor Amplifier Circuit using h-parameters

UNIT-V:

Field Effect Transistor and FET Amplifiers

Field Effect Transistor: The Junction Field Effect Transistor (Construction, principle of

operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

FET Amplifiers: FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET.

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed., 1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learning, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford

REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2Ed, 2013.
4. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH.

Course Outcomes:

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

- Describe the construction, operation and characteristics of electronic devices like P-N- Junction and special Purpose diodes (Understand).
- Determine the application of diode as a rectifier (Apply)
- Illustrate the application of transistors as amplifier employing BJT devices (Apply)
- Analyze the Biasing circuits using BJT Transistor Amplifier Circuit (Analyze)
- Evaluate construction, operation and characteristics of FET (Evaluate)
- Select Biasing circuits using FET Amplifiers (Analyze)

COURSE OUTCOMES (CO's)

Academic Year: 2021-22

Class:II YEAR-I SEM.

Course Name: Analog Electronics (R20ECE2105)

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

Course Outcomes (COs)	
C2105.1	Describe the construction operation and characteristics of electronic devices like PN Junction and Special purpose diodes.(K2-Understand)
C2105.2	Determine the application of diode as rectifier.(K3-Apply)
C2105.3	Illustrate the application of transistor as amplifier employing BJT devices.(K3-Apply)
C2105.4	Analyze the biasing circuits using BJT transistor amplifier circuits.(K4-Analyse)
C2105.5	Evaluate construction operation and characteristics of FET.(K5-Evaluate)
C2105.6	Select biasing circuits using FET amplifiers.(K4-Analyse)

Mapping of Course Outcomes(CO's) with PO's:

CO	PO											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C2105.1	3	3	-	-	-	-	-	-	-	-	-	-
C2105.2	3	3	-	-	-	-	-	-	-	-	-	-
C2105.3	3	2	3	3	-	2	-	-	-	-	-	-
C2105.4	3	2	3	3	-	2	-	-	-	-	-	-
C2105.5	3	2	3	3	-	2	-	-	-	-	-	-
C2105.6	3	2	3	3	-	3	-	-	-	-	-	-
C2105	3	2.3	3	3	-	2.2	-	-	-	-	-	-

3. High 2. Medium 1. Low

Mapping of Course Outcomes(CO's) with PSO's:

COs	PSO1	PSO2	PSO3
C2105.1	3	2	2
C205.2	3	2	2
C2105.3	3	2	2
C2105.4	3	2	3
C2105.5	3	2	3
C2105.6	3	2	3
	3	2	2.5



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Faculty Name & Designation	K.RAM MOHAN RAO / P. PRASHANT		

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			From	To				
	UNIT – I							
I	P-N JUNCTION DIODE					15		
1.1	Introduction & Qualitative Theory of p-n junction	T1, R 6	115,47	117,50	Black board	01		CO-1, L2
1.2	p-n junction as a Diode	T1, T2	117,298	120,320	Black board	01		CO-1, L2
1.3	Diode Equation	R 6	53	54	Black board	01		CO-1, L2
1.5	Volt-Ampere Characteristics	T1,R6	127,50	129,50	Black board	01		CO-1, L2
1.6	Temperature dependence of VI characteristics, static and Dynamic Resistances	T1,R6	130,55	132,55	Black board	01		CO-1, L1
1.7	Diffusion Transition and Capacitances	T1,R6	134,54	139,54	Black board	01		CO-1, L2
1.8	Diode Equivalent Circuits	T1	90	92	Black board	01		CO-1, L2
1.9	Load Line Analysis	T1	179	181	Black board	01		CO-1, L1
1.9	Breakdown Mechanisms in Semiconductor Diodes	T1,R6	143,58	146,58	Black board	01		CO-1, L2
1.10	Zener Diodes Characteristics	T1,R6	143,86	146,86	Black board	01		CO-1, L2
	SPECIAL PURPOSE ELECTRONIC DEVICES							
1.11	Principle of Operation and Characterises of Tunnel Diode	T1,R6	147,88	154,91	Black board	02		CO-1, L2
1.12	Varactor Diode	T2,R6	328,87	328,87	Black board	01		CO-1, L2
1.13	SCR characteristics	R6	135	137	Black board	01		CO-1, L2



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			From	To				
UNIT - I								
1.14	Semiconductor photo Diode	T2,R6	330,92	332,93	Black board	01		CO-1, L2
	Review							
Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
II								
UNIT - II								
RECTIFIERS AND FILTERS						10		
2.1	The p-n junction as a rectifier	T1, R 5	120	124	Black board	01		CO-2, L2
2.2	Half wave Rectifier	T1, R 5	592	597	Black board	01		CO-2, L2
2.3	Centre tapped Full Wave Rectifier,	T1, R 5	598	599	Black board	01		CO-2, L2
2.4	Bridge Rectifier	T1, R 5	600	601	Black board	01		CO-2, L2
2.5	Harmonic Components in a Rectifier Circuit	T1, R 5	602	602	Black board	01		CO-2, L2
2.6	Inductor Filters, Capacitor filters,	T1,R 5	603	609	Black board	01		CO-2, L2
2.7	L-section Filters, π -Section Filters	T1,R 5	611	620	Black board	01		CO-2, L2



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			From	To					
UNIT - I									
2.8	Comparison of Filters	T1,R 5	621	621	Black board	01		CO-2, L2	
2.9	Problems on Halfwave Rectifier	T1, R5	737	740	Black board	01		CO-2, L3	
2.10	Problems on Fullwave Rectifier	T1, R 5	741	744	Black board	01		CO-2, L3	
	Review	Signature of the HOD/Coordinator							
UNIT- III									
Bipolar Junction Transistor and UJT						09			
3.1	Junction Transistor, Transistor Current Components	T1	220	225	Black board	01		CO-3,L2	
3.2	Transistor as an Amplifier	T1	225	225	Black board	01		CO-3,L3	
3.3	Transistor Construction, BJT Operation	T1	226	229	Black board	01		CO-3,L1,L2	
3.4	BJT Symbol, Common Base Configuration	T1	231	234	Black board	01		CO-3,L1,L2	
3.5	Common Emitter and Common Collector Configurations	T1	234	244	Black board	01		CO-3,L2	
3.6	Limits of Operation,	T1	256	257	Black board	01		CO-3,L4	
	BJT Specifications	T1	260	262	Black board				
	BJT Hybrid Model	T1	296	298	Black board				




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3.7	Determination of h-Parameters from Transistor Characteristics	T1	298	302	Black board	01		CO-3,L4
3.8	Comparison of CB,CE,CC Amplifier Configurations	T1	312	316	Black board	01		CO-3,L2
3.9	UJT and Characteristics	T1 R6	415 130	416 132	Black board	01		CO-3,L1,L2
	Review	Signature of the HOD/Coordinator						
UNIT-IV								
IV	Transistor Biasing and Stabilization					10		
4.1	Operating Point, The DC and AC Load lines	T1	263	265	Black board	01		CO-4,L4
4.2	Need for Biasing, Fixed Bias, Collector FeedBack Bias	T1	265	269	Black board	01		CO-4,L4
4.3	Emitter Feedback Bias, Collector-Emitter Feedback Bias	T1	271	272	Black board	01		CO-4,L4
4.4	Voltage Divider Bias	T1	271	272	Black board	01		CO-4,L4
4.5	Bias Stability ,Stabilization Factors	T1	265	268	Black board	01		CO-4,L4
4.6	Stabilization against variations in V_{BE} and β	T1	276	279	Black board	01		CO-4,L4
4.7	Bias Compensation using Diodes and Transistors	T1	283	288	Black board	01		CO-4,L4
4.8	Thermal Runaway ,Thermal Stability	T1	288	292	Black board	01		CO-4,L4
4.9	Analysis of a Transistor Amplifier Circuit using h-parameters	T1	307	311	Black board	02		CO-4,L4

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	Review	Signature of the HOD/Coordinator						
UNIT-V								
V	Field Effect Transistor and FET Amplifiers					08		
5.1	Junction Field Effect transistor(Construction, Principle of operation, symbol)- pinch-off voltage	T1	385	389	Black board	01		CO-5,L2
5.2	Volt-Ampere Characteristics, JFET Small Signal Model	T1	390	396	Black board	01		CO-5,L2,L4
5.3	MOSFET(Construction, principle of operation, symbol)	T1	396	399	Black board	01		CO-5,L2
5.4	MOSFET characteristics in Enhancement and Depletionmodes	T1	396	399	Black board	01		CO-5,L2
FET Amplifiers								
5.5	FET Common Source Amplifier	T1	402	403	Black board	01		CO-6,L3
5.6	FET Common Drain Amplifier, Generalized FET Amplifier	T1	402	405	Black board	01		CO-6,L3
5.7	Biasing FET	T1	405	410	Black board	01		CO-6,L4
5.8	FET as Voltage Variable Resistor, Comparison of BJT ,FET	T1	413,123	415,123	Black board	01		CO-6,L3,L2
	Review	Signature of the HOD/Coordinator						

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LIST OF TEXT BOOKS AND REFERENCES

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and SatyabrataJit, 2 Ed., 1998, TMH.
2. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learning, 2013
3. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford

REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2Ed, 2013.
4. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.
5. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 Ed., 2009, Wiley India Pvt. Ltd.
6. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2Ed., 2008, TMH.

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WEBLINKS:

- [W1.http://edcforu.blogspot.com/p/notes.html](http://edcforu.blogspot.com/p/notes.html)
[W2.https://www.smartworld.com/notes/electronic-devices-and-circuits-edc/](https://www.smartworld.com/notes/electronic-devices-and-circuits-edc/)
[W3.https://lecturenotes.in/subject/509/electronic-devices-and-circuits-edc](https://lecturenotes.in/subject/509/electronic-devices-and-circuits-edc)
[W4.https://nptel.ac.in/noc/individual_course.php?id=noc18-ee10](https://nptel.ac.in/noc/individual_course.php?id=noc18-ee10)
[W5.https://freevidelectures.com/course/2261/basic-electronics-and-lab/2](https://freevidelectures.com/course/2261/basic-electronics-and-lab/2)
[W6.http://www.vidyarthiplus.in/2011/11/electronic-device-and-circuits-edc.html](http://www.vidyarthiplus.in/2011/11/electronic-device-and-circuits-edc.html)
[W7.http://www.nptelvideos.com/video.php?id=389](http://www.nptelvideos.com/video.php?id=389)
[W8.https://cosmolearning.org/courses/basic-electronics/video-lectures/](https://cosmolearning.org/courses/basic-electronics/video-lectures/)
[W9.https://nptel.ac.in/courses/117103063/](https://nptel.ac.in/courses/117103063/)
[W10.https://www.youtube.com/watch?v=8IIE1e6ujxw](https://www.youtube.com/watch?v=8IIE1e6ujxw)
[W11.https://www.youtube.com/watch?v=KFCgeI4j-Ig](https://www.youtube.com/watch?v=KFCgeI4j-Ig)
[W12.https://www.scribd.com/doc/130840933/Electronic-devices-and-circuits-By-Salivahanan-pdf](https://www.scribd.com/doc/130840933/Electronic-devices-and-circuits-By-Salivahanan-pdf)



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CONTENT BEYOND THE SYLLABUS

S.No	Topics	Proposed Actions	Date	Resource Person/Mode	POs	PSOs
1	Classification of Solid Materials	Web Reference			PO1,PO2	PSO1
2	Introduction to semiconductors	Web Reference			PO1,PO2	PSO1
3	Heat Sink	Web Reference			PO1,PO2,PO3,PO4	PSO1,PSO2
4	UJT Relaxation oscillator	Web Reference			PO1,PO2,PO3,PO4	PSO1,PSO2,PSO3

ASSIGNMENT

S.No.	Assignment Questions	Course Outcome	Books To be Referred	Date Of Announcement	Date Of Submission
1	What is depletion region? Discuss briefly the formation of depletion region & barrier potential?	C213.1	T1,R6		
2	Difference between p-type and n-type semiconductors?	C213.1	T1,R6		
3	Explain about the Half-wave Rectifier, draw circuit diagram & waveforms?	C213.4	T1,R6		



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4	Explain about the Full-wave Rectifier with circuit diagram & waveforms?	C213.4	T1,R6		
5	Write the principle of operation of unbiased transistor?	C213.1	T1,R6		

SELF STUDY TOPICS

S.No.	Topics	Books & Journals	Course Outcomes
1	Special purpose diodes applications	T1,R6	CO2
2	FET&MOSFET Comparison	T1,R6	CO5



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(Signature & Name)	Signature of the HOD/Coordinator



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QUESTION BANK (Regulation :R20) Department of Electronics and Communication Engineering		
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QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)

(1. Remembering 2. Understanding 3. Applying 4. Analyzing 5. Evaluating 5. Creating)

UNIT-1 P-N Junction Diode, Special purpose Electronic devices			
2MARKS QUESTIONS		BT Level	Course Outcome
1.	What is energy band diagram? Draw the energy band diagram of semiconductor? (R16-April/May-2018& R13- December - 2018)	2	CO1
2.	Explain the operation of diode as a switch (R16-April/May-2018)	2	CO1
3.	Explain how the reverse saturation current of a p-n diode varies with temperature. (R13- Nov/Dec - 2018)	2	CO1
4.	Draw Zener Diode Characteristics. (R15- March – 2017)	2	CO1
5.	Draw the Diode Equivalent Circuit. Mention the applications of PN-junction diode. (R15- March - 2017)	2	CO1
6.	Explain the term knee voltage and Breakdown voltage with respect to diodes.(R16- Nov/Dec – 2017)	2	CO1
7.	Draw V-I characteristics of Zener Diode. Explain its breakdown mechanism.(R14- NOV-2016)	2	CO1
8.	Discuss the load line analysis of a diode.(R14- Nov-2015)	1	CO1
10 MARKS QUESTIONS			
1.	Explain the Avalanche and Zener Breakdowns in PN junction diode (R15- March – 2017,R16- NOV-2017)	2	CO1
2.	Derive the Expression for the transition capacitance of a reverse biased p-n junction diode.(R16- OV-201N7)	2	CO1
3.	With help of neat sketch, Explain the V-I characteristics of a p-n junction diode. How the V-I characteristics are depending on temperature.(R14- NOV-2016)	2	CO1
4.	What is the difference between Tunnel diode and varactor diode? Explain their operations and applications. .(R14- NOV-2016)	2	CO1



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5.	Draw and Explain the V-I characteristics of Zener Diode. Discuss the breakdown mechanism in zener diode.(R14-NOV-2015)	2	CO1
6.	State the various methods to turn on the SCR and give the applications of SCR. (R14-NOV-2015)	2	CO1
7.	Discuss the effect of temperature on diode with neat sketch. (R14-NOV-2015)	1	CO1
8.	Define static and Dynamic resistances of a diode. Also compare the V-I characteristics of si and Ge diodes. (R14-NOV-2015)	2	CO1

Unit -II : Rectifiers and Filters

2 MARKS QUESTIONS

1.	Derive Expression for I_{dc} of Half wave rectifier (R14- NOV-2016)	2	CO2
2.	Derive Expression for V_{rms} of Half wave rectifier (R14- NOV-2016)	2	CO2
3.	Derive Expression for I_{dc} of Full wave rectifier (R14- NOV-2016)	2	CO2
4.	Derive Expression for V_{rms} of Full wave rectifier (R14- NOV-2016)	2	CO2
5.	Define Terms : Ripple Factor, TUF(R14- NOV-2015)	2	CO2
6.	Define Terms : Efficiency, Voltage Regulation and Peak inverse voltage (R14- NOV-2015) (R16- NOV-2019)	2	CO2
7.	What is Need Filter in Power Supply(R16- May-2018)	2	CO2
8	Give The Values of Ripple Factor And Efficiency For Full wave Rectifier (R16- NOV-2017)	1	CO2
9	Give The Values of Ripple Factor And Efficiency For Half wave Rectifier (R16- NOV-2017)	1	CO2
10	Explain Bridge Rectifier	2	CO2

5 MARKS QUESTIONS

1	Discuss The Operation of HW Rectifier With Capacitor Filter With necessary waveform (R16- NOV-2017)	1	CO2
2.	Discuss The Operation of HW Rectifier Without Capacitor Filter With necessary waveform (R16- NOV-2017)	1	CO2



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3.	Obtain Maximum Efficiency, Ripple Factor, Transmition Utilization Factor of Half Wave Rectifier (R14- NOV-2016)	3	CO2
4.	Obtain Maximum Efficiency, Ripple Factor, Transmition Utilization Factor of Full Wave Rectifier (R14- NOV-2016)	3	CO2
5.	With The help of Neat Sketch Explain Full wave Rectifier with Capacitive Filter And Derive Expression for Ripple Factor With Capacitive Filter (R14- NOV-2016)(R14- NOV-2015)	2	CO2
6.	Discuss Harmonic Components in a Rectifier Circuit (R14- NOV-2015)	1	CO2
7.	Draw The Circuit Diagram Of Half wave rectifier with Inductor Filter and Explain it (R16- NOV-2019)	2	CO2
8.	Proof that Regulation of Both Half wave rectifier and Full wave Rectifier is given by % Regulation = $(R_f/R_l) \times 100\%$ (R16- NOV-2019)	2	CO2
9.	Derive Expression for Ripple Factor in Full wave Rectifier With Inductor Filter (R16- May-2018)	3	CO2
10.	Draw And Explain The circuit Diagram of Half Wave Rectifier L section Filter (R16- Nov-2017)	1	CO2

Unit -III : Bipolar Junction Transistor & UJT

2 MARKS QUESTIONS

1.	What are the different Configurations of BJT? (R16- May-2018)	1	CO3
2.	Explain briefly how Transistor acts as an Amplifier? (R16- Sep-2017)	2	CO3
3.	Compare CC,CE&CB Configurations? (R16- Nov-2017)	2	CO3
4.	What is h-parameters for a Transistor? (R16- Nov-2017)	1	CO3
5.	List the Advantages of h-parameters? (R16- Nov-2017)	1	CO3
6.	What is UJT & Draw the Constructional Diagram? (R16- Nov-2017)	1	CO3
7.	Why CC is named as Emitter follower?	1	CO3
8.	What is h_{fe} ? Define it for CE Configurations?	1	CO3



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9.	Define α and β ? (R14- Nov-2016)	1	CO3
10	If the Transistor has $\alpha=0.98$, Find the value of β and if $\beta=200$, Find α ? (R16- Sep-2017)	3	CO3
5 MARKS QUESTIONS			
1.	Explain input & Output Characteristics of a Transistor in CB Configuration? (R16- Nov-2017)	2	CO3
2	Determine the h-Parameters for Common Emitter Configuration from the Characteristic curves? (R16- Sep-2017)	4	CO3
3.	Explain the Working Principle and Operation of UJT & V-I Characteristics? (R16- Nov-2017)	2	CO3
4	Explain the Input and Output Characteristics of a Transistor in Common Collector Configuration?	2	CO3
5.	a) Define Intrinsic Stand-off Ratio of UJT? b) Mention Some Applications of UJT?	1	CO3
6	Draw the Circuit Diagram of an NPN Junction Transistor CE Configuration and Describe the Static Input & Output Characteristics. Also Define Active, Saturation and Cutoff regions and Saturation resistance of a CE Transistor? (R16- May-2018)	2	CO3
7.	a) Derive the Relation among α , β and γ ? b) Determine I_C , I_E and α for a Transistor Circuit having $I_B=15\mu A$ and $\beta=150$? (R16- May-2018)	5	CO3
8.	a) For the NPN Transistor connected in CE Configuration with $V_{CC}=9V$, $V_{BB}=4V$, $I_C=5mA$, $V_{CE}=5V$, $\beta=50$ and $V_{BE}=0.7V$. Find β and R_B ? (R16- Sep-2017) b) From the Transistor Current Components, deduce the Current equation of Transistor? (R16- Sep-2017)	5	CO3
9.	Explain the Working Principle of NPN & PNP Transistor?	2	CO3



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10	a) Why Transistor is Considered as a Current Controlled Device? Explain in detail? b) Compare CB, CC and CE Configurations ? (R16- Sep-2017)	2	CO3
Unit-IV : Transistor Biasing and Stabilization			
2 MARKS QUESTIONS			
1.	Explain the criteria for fixing operating point. (R-16- Nov - 2017)	2	CO4
2.	What is the need of biasing? (R-14- Nov - 2015) (R-16- Nov-2017,May-2018)	1	CO4
3.	How to obtain Q point graphically for a given transistor in CE configuration. (R-14- Nov - 2015)	2	CO4
4.	Define Q point.	1	CO4
5.	What are the advantages of self-biasing circuit? (R-16- Oct/Nov - 2017)	1	CO4
6.	What are the advantages of fixed biasing circuit? (R-16- Oct/Nov - 2017)	1	CO4
7.	Define DC Load line.	1	CO4
8.	List the biasing circuits.	1	CO4
5 MARKS QUESTIONS			
1.	a) A silicon transistor uses voltage divider bias method with $\beta = 50$, $V_{cc} = 12V$, $R_c = 4K\Omega$, $R_1 = R_2 = 10K\Omega$ and $R_E = 3K\Omega$. Determine the operating point. b) What do you understand by DC and AC load lines? (R-16- Nov/Dec - 2018)	3	CO4
2.	Design a self bias circuit for the following specifications: $V_{CC} = 12V$; $V_{CE} = 2V$; $I_C = 4mA$; $h_{fe} = 80$. Assume any other design parameters required. Draw the designed circuit. (R-16- Nov - 2017)	6	CO4



SRI INDU COLLEGE OF ENGG & TECH QUESTION BANK (Regulation :R20) Department of Electronics and Communication Engineering		(Regulation :R20) Prepared on Rev1: Page: 6 of 9	
Sub. Code & Title		R20ECE2105&Analog Electronics	
Academic Year: 2022-23		Year/Sem./Section	II/I/A,B,C,D
Faculty Name & Designation		K.RAM MOHAN RAO / P. PRASHANT	

3.	Derive the expressions for A_v , Z_i , Z_0 and A_i of a voltage shunt feedback amplifier. (R-16- Nov - 2017) <p style="text-align: center;">(or)</p> Derive the expressions for A_v , Z_i , Z_0 and A_i of a common emitter amplifier. (R-14- Nov - 2016)	4	CO4
4.	Obtain the stability factor for a collector to base bias. (R-14-Nov-2015) (or) Explain the collector to base bias method along with circuit diagram and derive the stability factor for it. (R-16- May-2018)	2	CO4
5.	Consider a single stage CE amplifier circuit with $R_s = 1K\Omega$, $R_1 = 50K\Omega$, $R_2 = 2K\Omega$, $R_C = 1K\Omega$, $R_L = 1.2K\Omega$, $h_{fe} = 50$, $h_{ie} = 1.1K$, $h_{oe} = 25\mu A/V$, $h_{re} = 2.5 \times 10^{-4}$ as shown in fig. Find A_i , R_i , A_v , A_{is} , A_{vs} and R_o . (R-14-Nov-2015)	4	CO4



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6.	A common emitter transistor amplifier with voltage divider bias circuit is designed to establish the quiescent point at $V_{CE}=12V$, $I_C=2mA$ & stability factor ≤ 5.2 of $V_{CC}=24V$, $V_{BE}=0.7V$, $\beta =50$ & $R_C=4.7K\Omega$. Determine the values of resistors R_E , R_1 & R_2 . (R-14- Nov - 2016)	4	CO4
7.	a) Explain any two bias compensation techniques. b) what is thermal runaway? Explain how it can be avoided. (R-16-Oct/Nov-17)	2	CO4
8	Draw the circuit diagram of a voltage divider bias circuit and explain how it stabilizes the operating point.	2	CO4
9	An npn transistor if $\beta =50$ is used in CE circuit with $V_{CC}=10V$, $R_C = 2K \Omega$. The bias is obtained by connecting $100K \Omega$ resistor from collector to base. Find the quiescent point & stability factor. (R-16-Oct/Nov-17)	4	CO4

Unit-V: Field Effect and FET Amplifiers

2 MARKS QUESTIONS

1.	Explain the generalized analysis of small signal model in detail? (R16-May-2018)	2	CO5
2.	Explain the working principle of n-MOSFET? (R16-Sept-2017)	2	CO5
3.	What are the differences between BJT and JFET? (R16-Sept-2017)	1	CO5
4.	Write the applications of JFET? (R16-Oct/Nov-2017)	1	CO5
5.	Explain briefly drain characteristics of n-channel enhancement MOSFET? (R16-Sept-2017)	2	CO5



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Academic Year: 2022-23		Year/Sem./Section	II/I/A,B,C,D
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6.	What are the advantages of FET when compared to BJT? (R16-May-2019)	1	CO5
7.	List the important features of FET and explain why FET is a unipolar device? (R14-Nov-2014)	1	CO5
8.	Draw the small signal model of FET? (R15-Sept-2017)	1	CO5
9.	Explain the operation of JFET ? (R16-Nov-2017)	2	CO5
10.	What happens to the drain current of p-channel JFET when a positive voltage is applied on its gate?	1	CO5
11.	A JFET has a pinch off voltage of 4volts and saturation current of 9 mA. Calculate the drain current if $V_{GS} = -2$ Volt.	4	CO5

5 MARKS QUESTIONS

1.	Draw the characteristics and explain the operation of enhancement and depletion mode MOSFET. (R16-Nov-2017)	2	CO5
2.	Describe the construction and working principle of enhancement mode and depletion mode MOSFET and draw its characteristics? (R16-Sept-2017)	2	CO5
3.	A self-biased p-channel JFET has a pinch off voltage of $V_p = 5V$ and $I_{DSS} = 12$ mA. The supply voltage is 12V. Determine the values of R_D and R_s so that $I_D = 5mA$ and $V_{DS} = 6V$. (R16-Nov-2017)	4	CO5
4.	Draw the small signal model of Common Source FET amplifier derive the expression for voltage gain and output impedance? (R14-Nov-2016)	2	CO5



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5.	Define the parameters transconductance (gm), drain resistance (rd) and amplification factor(μ) of a JFET. Establish the relation between them. Draw and explain V-I characteristics of MOSFET in depletion and enhancement mode?(R14-Nov-2016)	2	CO5
6.	Draw the construction diagram, operation characteristics and parameters of JFET?(R16-Sept-2017)	2	CO5
7.	Draw the drain characteristics of n-channel JFET. Explain shape of characteristics and identify the regions. (R14-Nov-2015)	2	CO5
8.	An n-channel JFET has $I_{DSS}=10\text{mA}$ and $V_P=-2\text{V}$ determine the drain source resistance r_{ds} for i) $V_{GS}=0\text{V}$, ii) $V_{GS}=-0.5\text{V}$ (R16-Sept-2017)	4	CO5
9.	Derive the expressions for $Z_i, Z_o,$ and A_v for common drain JFET amplifier?(R16-Sept-2017)	2	CO5
10	Draw and explain transfer characteristics of n-channel depletion MOSFET and show the enhancement and depletion modes on it?	2	CO5



SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi) - Recognized under 2(f) and 12(B) of UGC Act 1956

II B.Tech I Semester (Reg./Suppl.) End Examinations March - 2021

ANALOG ELECTRONICS

08/03/2021

(Common to EEE, CSE and IT)

Day- 1

Duration: 3 Hrs

Marks: 5Qx14M = 70M

Answer **FIVE** questions (Treat Q.No.11 as a single question).

UNIT-I

1. Explain the effect of temperature on V-I Characteristics of P-N Junction diode.

(OR)

2. Explain about the transition and diffusion capacitances.

UNIT-II

3. Discuss the operation of a HW rectifier with and without capacitor filter with necessary waveforms.

(OR)

4. Explain about the FW bridge rectifier and compare performance of inductive L-section and PI- section filters.

UNIT-III

5. Explain current components in BJT with neat sketch.

(OR)

6. Compare CE, CB & CC Configurations.

UNIT-IV

7. Derive the stability factor for self bias circuit using BJT.

(OR)

8. Explain the term thermal resistance and derive the condition for thermal stability of BJT.

UNIT-V

9. Comparison of BJT and FET.

(OR)

10. A Self biased P-channel JFET as a pinch-off voltage of $V_P = 9V$ and $I_{DSS} = 52mA$. The Supply voltage is $9V$. Determine the values of R_D so that $I_D = 5mA$ and $V_{DS} = -12V$.

11. Answer any **THREE** questions from the following. (5M+5M+4M)

- What is an ideal diode?
- Define ripple factor and give ripple factor for LC filter.
- Why NPN Transistor is preferred over PNP transistor.
- Distinguish between negative and positive feedback in amplifiers.
- Write the Volt-ampere Characteristics.

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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II B.Tech - I Semester –End Examinations (Suppl.) October-2020

R18ECE2105 – ANALOG ELECTRONICS

(Common to EEE,CSE & IT)

Duration:2 Hrs

12.10.2020 (FN)

Max Marks:70M

Section – A

Answer Any **Three** of the following questions.

Marks: 3Qx6M =18M

1. Give the comparison of filters.
2. Explain the need for Biasing.
3. List the differences between JFET and MOSFET.
4. Explain the stabilization Factors in Transistor Biasing.
5. Explain the BJT hybrid model .

Section – B

Answer **FOUR** questions from the following

Marks: 4Qx13M = 52M

UNIT – I

6. Derive the expression for the diffusion capacitance of a p-n junction diode.

(OR)

7. Explain the principle of operation and characteristics of Tunnel diode.

UNIT - II

8. Explain with neat diagram and waveforms the working of centre tap full wave rectifier. Show that efficiency of full wave rectifier is 18 %.

(OR)

9. Discuss the operation of a Half wave rectifier with capacitor filter with necessary waveforms.

UNIT - III

10. Draw and explain the h-parameter equivalent circuit of a transistor in CB configuration. Derive the expressions for input impedance, output impedance, voltage gain and current gain.

(OR)

11. Explain the working and principal of operation of UJT and mention its applications.

UNIT - IV

12. Design a voltage divider bias circuit for the given conditions: $I_C = 1\text{mA}$, $S_{ICO} = 30$, $\beta = 100$, $V_E = 2\text{V}$, $V_{CE} = 8\text{V}$ and $V_{CC} = 12\text{V}$. Draw the circuit diagram.

(OR)

13. Derive the expressions for A_v , Z_i , Z_o and A_i of a current series feedback amplifier.

UNIT-V

14. Draw the typical drain characteristics of P-Channel JFET and indicate various regions and explain.

(OR)

15. A self biased p-channel JFET has a pinch – off voltage of $V_P = 3\text{V}$ and $I_{DSS} = 10\text{mA}$. The supply voltage is 12V . Determine the values of R_D and R_S so that $I_D = 4\text{mA}$ and $V_{DS} = 8\text{V}$.

D4 - AUTONOMOUS

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

Recognized under 2(f) and 12(B) of UGC Act 1956

II B.Tech – I Semester – (Regular) End Examinations - November - 2019**ANALOG ELECTRONICS****(Common to EEE, CSE, IT)****Duration: 3 Hrs****04.11.2019****Max Marks: 70M****Section - A****Answer All the following questions****Marks: 5Qx4M = 20M**

1. Explain how Zener Diode helps in Voltage Regulation.
2. Explain the working of PN Junction diode under reverse biased conditions.
3. Explain the drain characteristic of a JFET with neat diagram.
4. With neat diagram explain Varactor diode.
5. Write comparisons of CC, CE and CB configuration.

Section - B**Answer any FIVE questions choosing at least one from each Unit****Marks: 5Qx10M = 50M****UNIT : I**

6. Explain the temperature dependence of VI characteristics.
(OR)
7. Explain the avalanche diode and its breakdown mechanism.

UNIT : II

8. A FER makes use of a π -section filter with two 8μ f capacitors and one 20 H choke. The secondary voltage is 300 V w.r.t centre tap. If the load current is 40m A, determine the D.C output voltage and ripple without neglecting the choke resistance of 300Ω .
(OR)
9. Consider a half wave and full wave rectifier with capacitor input filter. Derive an expression for ripple factor.

UNIT : III

10. Draw and explain the h-parameter equivalent circuit of a transistor in CC configuration. Derive the expressions for input impedance, output impedance, voltage gain and current gain.
(OR)
11. Explain the working and principal of operation of UJT and mention its applications.

UNIT : IV

12. Design a self bias circuit for the following specifications:
 $V_{CC} = 12$ V : $V_{CE} = 2$ V : $I_C = 4$ mA : $h_{fe} = 80$. Assume any other design parameters required. Draw the designed circuit.

(OR)

13. Derive the expressions for A_v , Z_i , Z_o and A_i of a voltage shunt feedback amplifier.

UNIT : V

14. Draw the characteristics and explain the operation of enhancement and depletion mode MOSFETS.

(OR)

15. Consider a n-channel JFET using voltage divider bias. Explain its DC analysis. Also derive an expression for transconductance g_m .

D4 - AUTONOMOUS

Section – A**Answer All the questions****Marks: 5Qx1M = 5M**

1. Write any two differences between Zener breakdown and Avalanche breakdown.
2. What are the applications of a p-n diode?
3. What are the types of filter?
4. What are the advantages of Bridge rectifier?
5. What is a transistor? Give its circuit symbol.

Section – B**Answer any FOUR questions****Marks: 4Qx5M = 20M**

6.
 - a) Find the value of D.C. resistance and A.C resistance of a Germanium junction diode at 25°C with reverse saturation current, $I = 25\mu\text{A}$ and at an applied voltage of 0.2 V across the diode.
 - b) A Si diode has a Reverse saturation current of $7.5\mu\text{A}$ at room temperature calculate Reverse saturation current at 400°K
7. Explain the operation of Varactor diode with the help of neat diagrams.
8. Explain about Zener diode as a Regulator.
9. Draw the circuit of full-wave rectifier with π -section filter and derive expression for its ripple factor?
10. Draw the circuit of bridge rectifier and explain its operation with the help of input and output waveforms.
11. Derive the expression for output current of a transistor in CB configuration and explain in brief.

II B.Tech - I Semester - II Mid Term Examinations**(R18ECE2105) ANALOG ELECTRONICS - (Common to EEE, CSE & IT)****Duration: 90Mins****Dt: 30.10.2019 FN****Max Marks: 25M**

Section – A**Answer ALL the questions****Marks: 5Qx1M = 5M**

1. Give the relation between α and β .
2. Define Thermal run away.
3. What is the need of biasing the transistor for stability?
4. Give the classification of FETs.
5. What is pinch-off voltage?

Section – B**Answer any FOUR questions****Marks: 4Qx5M = 20M**

6. Derive the expression for A_I , A_V , R_I and R_O for CB amplifier using h-parameter model.
7. Compare CB, CE and CC amplifiers in view of A_V , A_I , R_I , & R_O
8. Explicate Voltage Divider biasing of a transistor.
9. What do you mean by the Quiescent point of transistor amplifier?
10. With neat sketches, necessary equations explain the drain and transfer characteristics of MOSFET in Enhancement mode.
11. Draw the small-signal model of common drain JFET amplifier. Derive expressions for voltage gain and output impedance.

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
DEPARTMENT Academic CALENDAR – 2022-2023 (SEMESTER-1)

DAYS										
SUNDAY				NOVEMBER '22						
MONDAY				1		DECEMBER '22			FEBRUARY'23	
TUESDAY	SEPTEMBER'22 2			2					1	MID EXAM-II
WEDNESDAY				3		1			2	PRACTICAL EXAM
THURSDAY	1			OCTOBER '22		4		2	3	PRACTICAL EXAM
FRIDAY	2		1	Bathukamma Celebrations	5		3		JANUARY'23	
SATURDAY	3		2	Gandhi Jayanti/HOLIDAY	6	HOLIDAY	4	HOLIDAY	1	NEW YEAR/HOLIDAY
SUNDAY	4	HOLIDAY	3	DASARA HOLIDAYS	7		5		2	PRACTICAL EXAM
MONDAY	5		4	DASARA HOLIDAYS	8	GURUNANAK JAYANTHI	6		3	PRACTICAL EXAM
TUESDAY	6		5	DASARA HOLIDAYS	9		7		4	PRACTICAL EXAM
WEDNESDAY	7		6	DASARA HOLIDAYS	10		8		5	PRACTICAL EXAM
THURSDAY	8		7	DASARA HOLIDAYS	11		9		6	PRACTICAL EXAM
FRIDAY	9	Ganesh Nimajanam	8	DASARA HOLIDAYS	12		10		7	PRACTICAL EXAM
SATURDAY	10		9	HOLIDAY	13	HOLIDAY	11	HOLIDAY	8	HOLIDAY
SUNDAY	11	HOLIDAY	10		14		12		9	END EXAM
MONDAY	12		11		15		13		10	END EXAM
TUESDAY	13		12		16		14		11	END EXAM
WEDNESDAY	14		13		17		15		12	END EXAM
THURSDAY	15		14		18		16		13	BHOGI
FRIDAY	16		15		19		17		14	SANKRANTHI
SATURDAY	17	Telangana vimochna dinostavam	16	HOLIDAY	20	HOLIDAY	18	HOLIDAY	15	HOLIDAY
SUNDAY	18	HOLIDAY	17		21		19		16	HOLIDAY
MONDAY	19		18		22		20		17	END EXAM
TUESDAY	20		19		23		21		18	END EXAM
WEDNESDAY	21		20		24		22		19	END EXAM
THURSDAY	22		21		25		23		20	END EXAM
FRIDAY	23		22		26		24		21	END EXAM
SATURDAY	24		23	HOLIDAY	27	HOLIDAY	25	CHRISTMAS/HOLIDAY	22	HOLIDAY
SUNDAY	25	HOLIDAY	24		28	MID EXAM-I	26	BOXING DAY/HOLIDAY	23	

MONDAY	26	Commencement of Classes (II Yr)	25	DIWALI	29	MID EXAM-I	27		24		28
TUESDAY	27		26		30	MID EXAM-I	28		25		29
WEDNESDAY	28		27				29		26	Republic Day	
THURSDAY	29		28				30		27		
FRIDAY	30		29				31		28		
SATURDAY			30						29	HOLIDAY	
SUNDAY			31						30	MID EXAM-II	
MONDAY									31	MID EXAM-II	

CALENDAR INCHARGE

**HOD/CSE
DEAN**

PRINCIPAL



Sri Indu

College of Engineering & Technology

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NATIONAL ASSESSMENT AND
ACCREDITATION COUNCIL



HANDOUT

II Year I Semester

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2022-2023

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

HANDOUT- INDEX

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SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, Affiliated to JNTUH)

Sheriguda (V), Ibrahimpatnam (M), R.R. Dist-501510

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION OF THE INSTITUTE

To be a premier Institution in Engineering & Technology and Management with competency, values and social consciousness

MISSION OF THE INSTITUTE

- IM1:** Provide high quality academic programs, training activities and research facilities.
- IM2:** Promote Continuous Industry-Institute interaction for employability, Entrepreneurship, leadership and research aptitude among stakeholders.
- IM3:** Contribute to the economical and technological development of the region, State and Nation.

VISION OF THE DEPARTMENT

To be a technologically adaptive centre for computing by grooming the students as top notch professionals

MISSION OF THE DEPARTMENT

- DM1:** To offer quality education in computing.
- DM2:** To provide an environment that enables overall development of all the stakeholders.
- DM3:** To impart training on emerging technologies like Data Analytics, Artificial Intelligence and Internet of Things.
- DM4:** To encourage participation of stakeholders in research and development.

PROGRAM EDUCATIONAL OBJECTIVES(PEO'S)

PEO1	Higher Studies: Graduates with an ability to apply knowledge of Basic Sciences and programming skills in their career and higher education.
PEO2	Lifelong Learning: Graduates with an ability to adopt new technologies for ever changing IT industry needs through Self-Study, Critical thinking and Problem solving skills.
PEO3	Professional Skills : Graduates will be ready to work in projects related to complex problems involving multidisciplinary projects with effective analytical skills
PEO4	Engineering citizenship: Graduates with an ability to communicate well and exhibit social, technical and ethical responsibility in process or product.

PROGRAM SPECIFIC OUTCOMES (PSO'S)

Program Specific Outcomes	
PSO 1	To develop software projects using standard practices and suitable programming environment.
PSO 2	To identify, formulate and solve the real life problems faced in the society, industry and other areas by applying the skills of the programming languages, networks and databases learned.
PSO 3	To apply computer science knowledge in exploring and adopting latest technologies in various inter-disciplinary research activities.

PROGRAM OUTCOMES (PO'S)

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design / Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSE OUTCOMES (CO's)

Academic Year: 2022-23

Class: II YEAR-I SEM.

Course Name: PROBABILITY & STATISTICAL METHODS (R20MTH2103)

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

Course Outcomes (COs)	
C211.1	Describe the probability of an event, product rule, addition rule & Baye's rule.(Understand)
C211.2	Explain Random variables and Chebyshev's theorem, Discrete probability distribution(Understand)
C211.3	Calculate the area under the normal curve and applications of the normal distribution(Apply)
C211.4	Analyze the fundamental sampling distributions.(Analyze)
C211.5	Test the Hypothesis of single mean, double mean, single proportion, double proportion.(Evaluate)
C211.6	Evaluate Transition Probability Matrix.(Evaluate)

Mapping of Course Outcomes(CO's) with PO's:

CO	PO											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C211.1	3	2	3	2	-	-	-	-	-	-	2	2
C211.2	3	3	3	2	-	-	-	-	-	-	2	2
C211.3	3	3	3	3	-	-	-	-	-	-	2	2
C211.4	3	3	3	2	-	-	-	-	-	-	2	2
C211.5	3	3	3	2	-	-	-	-	-	-	2	2
C211.6	3	2	2	2	-	-	-	-	-	-	2	2
C211	3	2.66	2.83	2.16	-	-	-	-	-	-	2	2

3: High 2: Medium 1: Low

Mapping of Course Outcomes(CO's) with PSO's:

COs	PSO1	PSO2	PSO3
C211.1	2	2	1
C211.2	2	2	1
C211.3	2	2	2
C211.4	3	3	3
C211.5	3	3	3
C211.6	2	2	1
	2.3	2.3	1.83



LR.NO.SICET/AUTO/DAE/BR-20/ACADEMIC-CAL/520/2022

DATE: 05.09.2022

II B.TECH ACADEMIC CALENDAR
ACADEMIC YEAR : 2022-2023

Dr. G. SURESH,
Principal,
To,
All the HODs.
Sir,

Red

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for
II B.Tech - I & II Semester for the academic year **2022-23** – Reg.

The approved Academic Calendar for **II B.Tech – I & II Semester** for the academic
Year **2022-23** is given below:

ACADEMIC CALENDAR - II B.TECH - I & II SEMESTER
ADMITTED BATCH – (2021 – 2022) of BR-20 Regulation.

I SEMESTER

Commencement of I Sem class work	26.09.2022	
I Spell of Instructions (Including Dussehra Holidays).	26.09.2022 - 26.11.2022	9 Weeks
Dussehra Holidays.	03.10.2022 - 08.10.2022	1 Week
I Mid Examinations for II B.Tech I Sem Students.	28.11.2022 - 30.11.2022	3 Days
II Spell of Instructions.	01.12.2022 - 28.01.2023	8 Weeks 3 Days
Sankranti Holidays.	13.01.2023 - 16.01.2023	4 Days
II Mid Examinations for II B.Tech I Sem Students.	30.01.2023 - 01.02.2023	3 Days
Preparation Holidays, Practical Lab Examinations and Remedial Mid Test (RMT).	02.02.2023 - 11.02.2023	10 Days
II B.Tech I Semester End Examinations (Main) and Supplementary Examinations.	13.02.2023 - 25.02.2023	2 Weeks
Commencement of Class-Work for II B.Tech - II Semester 27.02.2023 (Monday).		

II SEMESTER

Commencement of II Sem class work.	27.02.2023	
I Spell of Instructions.	27.02.2023 - 22.04.2023	8 Weeks
I Mid Examinations for II B.Tech. II Sem. Students.	24.04.2023 - 26.04.2023	3 Days
II Spell of Instructions.	27.04.2023 - 05.07.2023	10 Weeks
Summer Vacation.	15.05.2023 - 27.05.2023	2 Weeks
II Mid Examinations for II B.Tech. II Sem. Students.	06.07.2023 - 08.07.2023	3 Days
Preparation Holidays, Practical Lab Examinations Remedial Mid Test (RMT).	10.07.2023 - 19.07.2023	10 Days
II B.Tech II Semester End Examinations (Main) and Supplementary Examinations.	20.07.2023 - 02.08.2023	2 Weeks
Commencement of Class-Work for III B.Tech - I Semester 07.08.2023 (Monday).		

Ves ed

Subra

[Signature]

Soorib

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
DEPARTMENT CALENDAR – 2021-2022 (FIRST SEMESTER)

DAYS											
SUNDAY											
MONDAY											
TUESDAY											
WEDNESDAY											
THURSDAY											
FRIDAY											
SATURDAY											
SUNDAY											
MONDAY											
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FRIDAY											
SATURDAY											
SUNDAY											
MONDAY											

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech. - II Year – I Semester

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(R20MTH2103) Probability & Statistical Methods

Objectives: To learn

- The theory of Probability, and probability distributions of single random variables
- The sampling theory and testing of hypothesis and making inferences
- Stochastic process and Markov chains.

UNIT-I: Probability

Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule,

Random Variables and Probability Distributions: Concept of a. Random variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence.

UNIT-II: Mathematical Expectation

Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

Discrete Probability Distributions: Introduction and Motivation, Binomial, Distribution, Geometric Distributions and Poisson distribution.

UNIT-III: Continuous Probability Distributions

Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions.

Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem,

Sampling Distribution of S^2 , t-Distribution, F-Distribution.

UNIT-IV: Estimation & Tests of Hypotheses

Introduction, Statistical Inference, Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion, Two Samples: Tests on Two Proportions.

UNIT-V: Stochastic Processes and Markov Chains

Introduction to Stochastic processes-Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

Text Books

1. Ronald E.Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists, 9thEd. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S.D.Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

References

1. T.T.Soong, Fundamentals of Probability And Statistics for Engineers, John Wiley & Sons, Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, academic press.

Course Outcomes:

- Describe the probability of an event, product rule, addition rule & boye's rule(Understand)
- Explain Random variables and chebyshev's theorem , Discrete probability distribution(Understand)
- Calculate the areas under the normal curve & applications of the normal distribution(Apply)
- Analyze the fundamental sampling distributions(Analyze)
- Test the Hypothesis of single mean, double mean, single proportion, double proportion(Evaluate)
- Evaluate Transition Probabilty matrix(Evaluate)



SRI INDU COLLEGE OF ENGG & TECH

(Regulation :R20)

LESSON PLAN

Department of Computer Science and Engineering

Sub. Code & Title

**(R20MTH2103)
PROBABILITY & STATISTICAL METHODS**

Academic Year:2022-2023

Year/Sem/Section

II/I/A&B&C&D

Faculty Name & Designation

**1. S. PRAVEEN KUMAR, Assistant Professor
2. V. ANURADHA , Assistant Professor**

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			From	To				
UNIT-I								
I	PROBABILITY					13		
1.1	Basics of probability - definitions	T1	22	23	Black board	1		CO1
1.2	Sample space, Events, Counting sample points, Probability of an event	T1	23	43	Black board	2		CO1
1.3	Additive Rules, Conditional Probability	T1	43	49	Black board	2		CO1
1.4	Independent and Product Rule, Baye's Rule	T1	50	60	Black board	2		CO1
1.5	Concept of Random Variable	T1	63	65	Black board	1		CO1,2
1.6	Discrete Probability Distributions	T1	65	69	Black board	2		CO1,2
1.7	Continuous Probability Distributions	T1	69	72	Black board	2		CO1,2
1.8	Statistical Independence	T1	81	83	Black board	1		CO1,2
	Review		Signature of the HOD/Coordinator					
Unit / Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
UNIT -II								
II	MATHEMATICAL EXPECTATION					12		
2.1	Mean of a Random variable	T1	88	9	Black board	1		CO2
2.2	Variance and Covariance of Random variables	T1	95	103	Black board	2		CO2
2.3	Mean and Variance of Linear Combination of Random variable	T1	103	111	Black board	2		CO2

2.4	Chebyshev's Theorem	T1	111	112	Black board	1		CO2
2.5	Discrete Probability Distributions: Introduction	T1	115	117	Black board	1		CO2
2.6	Binomial distribution	T1	117	122	Black board	2		CO2
2.7	Geometric Distribution	T1	132	135	Black board	1		CO2
2.8	Poisson distribution	T1	135	138	Black board	2		CO2

	Review	Signature of the HOD/Coordinator					
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Unit / Item No.	Topic (s)	Book Reference	Page (s)	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
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UNIT - III

III	CONTINUOUS PROBABILITY DISTRIBUTIONS					15		
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3.1	Continuous Uniform Distribution	T1	142	143	Black board	1		CO3
3.2	Normal Distribution, Area under the Normal curve	T1	143	152	Black board	2		CO3
3.3	Applications of Normal Distribution	T1	152	156	Black board	2		CO3
3.4	Normal Approximation to Binomial, Gamma and Exponential distributions	T1	158	167	Black board	1		CO3
3.5	Fundamental Sampling Distributions: Random Sampling, its statistics	T1	194	214	Black board	2		CO4
3.6	Sampling distribution of S^2	T1	216	219	Black board	2		CO4
3.7	t – Distribution	T1	219	225	Black board	4		CO4
3.8	F – Distribution	T1	225	226	Black board	1		CO4

	Review	Signature of the HOD/Coordinator					
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Unit / Item No.	Topic (s)	Book Reference	Page (s)	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
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UNIT- IV

IV	ESTIMATION & TESTS OF HYPOTHESIS					15		
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4.1	Introduction, classification of estimation	T1	230	234	Black board	1		CO5
4.2	Estimating the Mean	T1	234	240	Black board	1		CO5
4.3	Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits	T1	240	245	Black board	2		CO5

4.4	Estimating a Proportion for single mean, Difference of two means	T1	245	250	Black board	1		CO5
4.5	Maximum Likelihood Estimation	T1	275	280	Black board	1		CO5
4.6	Statistical Hypothesis: Introduction, Procedure of Testing a Statistical Hypothesis	T1	284	299	Black board	2		CO5
4.7	Test of Single mean	T1	300	306	Black board	1		CO5
4.8	Test of two means	T1	307	312	Black board	1		CO5
4.9	Test of Single Proportion	T1	323	326	Black board	2		CO5
4.10	Test of Two Proportions	T1	326	328	Black board	1		CO5

Review		Signature of the HOD/Coordinator					
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Unit / Item No.	Topic (s)	Book Reference	Page (s)	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
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UNIT - V

V	STOCHASTIC PROCESSES AND MARKOV CHAINS				10		
5.1	Introduction to Stochastic Process – Markov Process	T2	163	164	Black board	1	CO6
5.2	Transition Probability, Transition Probability Matrix	T2	164	168	Black board	3	CO6
5.3	First and Higher Order Markov Process	T2	169	172	Black board	1	CO6
5.4	N – step transition probabilities	T2	172	173	PPT	1	CO6
5.5	Markov chain, Steady state condition	T2	193	195	Black board	2	CO6
5.6	Markov Analysis	T2	195	198	Black board	2	CO6

Review		Signature of the HOD/Coordinator					
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**SRI INDU COLLEGE OF ENGG & TECH**

Department of Computer Science and Engineering


Regulation: R20

Sub. Code & Title**(R20MTH2103)
PROBABILITY & STATISTICAL METHODS****Academic Year: 2021-22****Year/Sem/Section****II/I/A&B&C&D****Faculty Name & Designation****S. PRAVEEN KUMAR, Assistant Professor
V. ANURADHA, Assistant Professor****LIST OF TEXT BOOKS AND REFERENCES****TEXT BOOKS:**

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability and Statistics for Engineering and Scientists, 9th Edition, Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical Statistics, Khanna publications.
3. S.D Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

REFERENCE BOOKS:

1. T.T.Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley and Sons, Ltd, 2004.
2. Sheldon M Ross, Probability and Statistics for Engineers and Scientists, academic press.

	SRI INDU COLLEGE OF ENGG & TECH		
	Department of Computer Science and Engineering		Regulation : R20
	Sub. Code & Title	(R20MTH2103) PROBABILITY & STATISTICAL METHODS	
	Academic Year: 2022-23	Year/Sem/Section	II/I/A & B & C & D
	Faculty Name & Designation	S. PRAVEEN KUMAR, Assistant Professor V. ANURADHA, Assistant Professor	


CONTENT BEYOND THE SYLLABUS

S. No	Topics	Proposed Actions	Date	Resource Person/Mode	P Os	PSOs
1	Bernoulli's and exponential distributions	To get knowledge		S Praveen Kumar U Anuradha	PO1	PSO1,PSO2
2	Classification of samples	To get knowledge		S Praveen Kumar U Anuradha	PO1	PSO1,PSO2

ASSIGNMENT

Sl. No	Assignment Questions	Course Outcome	Books To be Referred	Date of Announcement	Date Of Submission
1	Box A contains 5 red and 3 white marbles and box B contains 2 red and 6 white marbles. If a marble is drawn from each box, what is the probability that they are both of same color? (Remembering)	CO1	T1		
2	If S is a sample space, and E_1, E_2 are any two events in S and then prove that $P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$ (Evaluation)	CO1	T1		
3	A fair die is tossed. Let the random variable X denote the twice the number appearing on the die, Write the distribution of X, find the (i) mean (ii) variance. (Remembering)	CO2	T1		

4	If 2% of light bulbs are defective, Find (i) At least one is defective (ii) Exactly 7 are defective (iii) $P(1 < x < 8)$ in a sample of 100. (Remembering)	CO2	T1		
5	For the continuous probability function $f(x) = kx^2 e^{-x}$ when $x \geq 0$, find (i) k (ii) Mean (iii) variance. (Evaluation)	CO3	T2		
6	Find the probability of getting an even number on face 3 to 5 times in throwing 10 dice together. (Remembering)	CO3	R1		
7	What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. (Remembering)	CO5	T1		
8	In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that the both rice and wheat are equally popular in this state at 1% level of significance? (Analyzing)	CO5	T1		
9	A training process considered as a two state Markov chain. If it rains, it is considered to be in state '0' and it does not rains is in the state of '1'. The transition probability of the Markov chain is defined by $P = \begin{pmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{pmatrix}$ Find the probability that it will rain for 3 days from today assuming that it is raining today. (Remembering)	CO6	T1		
10	Explain briefly about the stochastic matrix and the Markov process. (Understanding)	CO6	T1		

	SRI INDU COLLEGE OF ENGG & TECH		Regulation : R20
	Department of Computer Science and Engineering		
	Sub. Code & Title	(R20MTH2103) PROBABILITY & STATISTICAL METHODS	
	Academic Year: 2022-23	Year/Sem/Section	II/I/A & B & C & D
	Faculty Name & Designation	S. PRAVEEN KUMAR, Assistant Professor V. ANURADHA, Assistant Professor	

QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)

(1. Remembering 2. Understanding 3. Applying 4. Analyzing 5. Evaluating 6. Creating)

UNIT- I: Probability & Random variables and Probability Distributions:				
1 MARK QUESTIONS			BT Level	Course Outcome
1	Define Sample Space. (Remembering)	1	CO1	
2	Define the probability. (Remembering)	1	CO1	
3	What is the probability of drawing an ace from a well shuffled deck of 52 playing cards? (Evaluation)	5	CO1	
4	Define Conditional event. (Remembering)	1	CO1	
5	Write the Product rule of two events. (Remembering)	1	CO1	
6	Write the statement of Baye's rule. (Remembering)	1	CO1	
7	Define the Random variable and its types. (Remembering)	1	CO1	
8	Define the axioms on probability. (Remembering)	1	CO1	
9	What is the probability that a card is drawn at random from the pack of cards may be either king or queen. (Evaluation)	5	CO1	
10	Define statistically independence of 2 events. (Remembering)	1	CO1	
10 MARK QUESTIONS			BT Level	Course Outcome
1	A problem statistics is given to three students A, B, C whose chances of solving it are 0.5, 0.75 and 0.25 respectively. What is the probability that the problem is solved (Remembering)	1	CO1	

2	Box A contains 5 red and 3 white marbles and box B contains 2 red and 6 white marbles. If a marble is drawn from each box, what is the probability that they are both of same color? (Remembering)	1	CO1																				
3	Two dice are thrown. Let A be the event that the sum of the points on the faces is 9. Let B be the event that at least one number is 6. Find i) $P(A \cup B)$ (ii) $P(A \cap B)$ (iii) $P(A^c \cup B^c)$. (Remembering)	1	CO1																				
4	In a bolt factory machines A, B, C manufacture 29% , 30% and 50% of the total of their output and 6%,3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A (ii) Machine B (iii) Machine C. (Remembering) .	1	CO1																				
5	A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from the bag B. (Remembering) .	1	CO1																				
6	A random variable X has the following probability distribution. <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Value of x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>P(x)</td> <td>a</td> <td>3a</td> <td>5a</td> <td>7a</td> <td>9a</td> <td>11a</td> <td>13a</td> <td>15a</td> <td>17a</td> </tr> </tbody> </table> <p>(i) Determine the value of a. (ii) Find $P(X < 3)$, $P(0 < x < 5)$ (iii) Find the distribution function of x. (Remembering).</p>	Value of x	0	1	2	3	4	5	6	7	8	P(x)	a	3a	5a	7a	9a	11a	13a	15a	17a	1	CO1
Value of x	0	1	2	3	4	5	6	7	8														
P(x)	a	3a	5a	7a	9a	11a	13a	15a	17a														
7	State and Prove Baye's theorem. (Evaluation)	5	CO1																				
8	If S is a sample space, and E_1, E_2 are any two events in S and then prove that $P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$ (Evaluation)	5	CO1																				
9	Suppose 5 men out of 100 and 25 out of women out of 1000 are color blind. A color blind person is chosen at random. What is the probability of the person being a male. (assume that men and women to be in equal numbers). (Remembering)	1	CO1																				
10	If the probability density of a random variable is given by $f(x) = K(1 - x^2)$; $0 < x < 1$ and $f(x) = 0$ otherwise (Remembering) Find the value of 'K' and the probabilities that a random variable will take on a value i) between 0.1 and 0.2 ii) greater than 0.5	1	CO1																				
UNIT-II : <u>Mathematical Expectation& Discrete Probability Distribution</u>																							
1 MARKS QUESTIONS		BT Level	Course Outcome																				
1.	Define Mean of Discrete Random variable (Remembering)	1	CO2																				
2.	Define Variance of (i) Discrete Random variable (ii) Continuous random variable. (Remembering)	1	CO2																				
3	Define the covariance of X and Y if X,Y are two discrete random variables. (Remembering)	1	CO2																				
4	Show that $E(aX+b)=a E(x)+b$ if a, b are constants. (Understanding)	2	CO2																				

5	What is Chebyshev's theorem. (Remembering)	1	CO2																
6	Write the Mean and Variance of Poisson distribution. (Remembering)	1	CO2																
7	Write the Mean and Variance of Binomial Distribution. (Remembering)	1	CO2																
8	Write the probability distribution of Poisson random variable X (Remembering)	1	CO2																
9	Define Geometric Distribution of random variable X. (Remembering)	1	CO2																
10	Write the recurrence relation of Poisson distribution. (Remembering)	1	CO2																
10 MARK QUESTIONS		BT Level	Course Outcome																
1	<p>A random variables X has the following probability function</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>X</td> <td>-3</td> <td>-2</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>P(x)</td> <td>K</td> <td>0.1</td> <td>k</td> <td>0.2</td> <td>2k</td> <td>0.4</td> <td>2k</td> </tr> </tbody> </table> <p>Find (i) k (ii) Mean (iii) variance (Remembering)</p>	X	-3	-2	-1	0	1	2	3	P(x)	K	0.1	k	0.2	2k	0.4	2k	1	CO2
X	-3	-2	-1	0	1	2	3												
P(x)	K	0.1	k	0.2	2k	0.4	2k												
2	Let X denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine, (i) Discrete probability distribution, (ii) Expectation and (iii) variance (Evaluation)	5	CO2																
3	Find the mean and variance of the uniform probability distribution given by $f(x) = 1/n$ for $x=1,2,3,\dots,n$. (Remembering)	1	CO2																
4	A fair die is tossed. Let the random variable X denote the twice the number appearing on the die, Write the distribution of X, find the (i) mean (ii) variance. (Remembering)	1	CO2																
5	If X is a continuous random variable and $Y=aX+b$, prove that $E(Y)=aE(x)+b$ and $V(Y)=a^2V(X)$ where V stands for variance and a, b are constants. (Evaluation)	5	CO2																
6	20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random (i) none is defective (ii) one is defective (iii) $P(1<x<4)$. (Remembering)	1	CO2																
7	Construct a binomial distribution to the following data, (Applying)	3	CO2																
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>X</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>f</td> <td>13</td> <td>25</td> <td>52</td> <td>58</td> <td>32</td> <td>16</td> <td>4</td> </tr> </tbody> </table>	X	0	1	2	3	4	5	6	f	13	25	52	58	32	16	4		
X	0	1	2	3	4	5	6												
f	13	25	52	58	32	16	4												
8	If 2% of light bulbs are defective, Find (i) At least one is defective (ii) Exactly 7 are defective (iii) $P(1<x<8)$ in a sample of 100. (Remembering)	1	CO2																
9	Prove that the mean and variance of Poisson distribution are equal (Evaluating)	5	CO2																
10	If X is Poisson variate such that, $3P(x=4) = 0.5 P(x=2) + P(x=0)$ then find the men of X and $P(x\leq 2)$. (Remembering)	1	CO2																

UNIT- III : Continuous probability distribution & Sampling Distribution

1 MARK QUESTIONS		BT Level	Course Outcome
1	Define the uniform distribution of a continuous random variable. (Remembering)	1	CO3
2	Write the mean and variance of continuous distribution. (Remembering)	1	CO3
3	Define Standard Normal distribution. (Remembering)	1	CO3
4	Define Gamma Distribution of a continuous random variable X. (Remembering)	1	CO3
5	Define Exponential Distribution of a continuous random variable X. (Remembering)	1	CO3
6	Write the mean and variance of Gamma distribution. (Remembering)	1	CO3
7	Write the mean and variance of exponential distribution. (Remembering)	1	CO3
8	Write the formula for the sample mean, sample variance. (Remembering)	1	CO3
9	What the central limit theorem. (Remembering)	1	CO3
10	What is finite population correction factor. (Remembering)	1	CO3
10 MARK QUESTIONS		BT Level	Course Outcome
1	For the continuous probability function $f(x)=kx^2e^{-x}$ when $x \geq 0$, find (i) k (ii) Mean (iii) variance. (Evaluation)	5	CO3
2	If the probability density of a random variable is given by $f(x) = K(1 - x^2); 0 < x < 1$ and $f(x) = 0$ otherwise (Remembering) Find the value of 'K', i) Mean and ii) Variance	1	CO3
3	In a Normal distribution 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution. (Evaluation)	5	CO3
4	In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5, Assuming the distribution to be normal, find (i) How many students score between 12 and 15? (ii) How many score above 18 (iii)How many score below 18 (Remembering)	1	CO3
5	Find the probability of getting an even number on face 3 to 5 times in throwing 10 dice together. (Remembering)	1	CO3
6	If X is a normal variate, find the area A (i) to the left of $z = -1.78$ (ii) to the right of $z = -1.45$	1	CO3

	(iii) Corresponding to $-0.8 \leq z \leq 1.53$ (iv) to the left of $z = -2.52$ and to the right of $z = 1.83$ (Remembering)		
7	A random sample of size 100 is taken from an infinite population having the mean $\mu=76$ and variance 256. What is the probability that x will be between 75 and 78. (Remembering)	1	CO3
8	Consider all the samples of size 2 are taken from population 3,6,9,15,27 with replacement. Then find i) The populations mean. ii) The population standard deviation. iii) The mean of the sampling distribution of means. iv) The standard deviation of the sampling distribution of means. (Remembering)	1	CO3
9	Explain briefly t-distribution. (Understanding)	2	CO3
10	Explain briefly F – distribution. (Understanding)	2	CO3
UNIT- IV : Estimation & Test of Hypothesis			
1 MARK QUESTIONS		BT Level	Course Outcome
1	Define an unbiased estimator. (Remembering)	1	CO4
2	Define point estimation and interval estimation. (Remembering)	1	CO4
3	What is the formula for sample size for estimating population mean? (Remembering)	1	CO4
4	What is the formula to calculate maximum error of estimate E ? (Remembering)	1	CO4
5	What is the formula for Bayesian interval for μ (Remembering)	1	CO4
6	Define maximum likelihood estimation function. (Remembering)	1	CO4
7	Write the test statistic for single mean. (Remembering)	1	CO5
8	Write the test statistic for difference of two means. (Remembering)	1	CO5
9	Write the test statistic for single proportion. (Remembering)	1	CO5
10	Write the test statistic for difference of two proportions. (Remembering)	1	CO5

10 MARK QUESTIONS		BT Level	Course Outcome												
1	The mean and standard deviation of a population are 11,795 and 14,054 respectively. If $n=50$, find 95% confidence interval for the mean. (Remembering)	1	CO4												
2	What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. (Remembering)	1	CO4												
3	Find 95% confidence limits for the mean of a normally distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14. (Remembering)	1	CO4												
4	A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs,487 with a standard deviation Rs.48. With what degree of confidence can we assert that the average weekly salary of all teachers in the metropolitan area is between 472 to 502 ? (Remembering)	1	CO4												
5	Explain the procedure of testing of hypothesis. (Understanding)	2	CO5												
6	A sample of 900 members has a mean of 3.4cms and S.D 2.61cm. Is this sample has been taken from a large population with mean 3.25cm If the population is normal and its mean is unknown, test the hypothesis and also find the 95% confidence limits of true mean. (Analyzing)	4	CO5												
7	A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there are 150 students having the mean IQ of 75 with a S.D of 15, in the second group there are 250 students having the mean IQ of 70 with S.D of 20. (Analyzing)	4	CO5												
8	The samples of students were drawn from two universities and from their weights in kilograms, means and standard deviations are calculated below. Make a large sample test to test the significance of the difference between the means. (Creating)	6	CO5												
<table border="1"> <thead> <tr> <th></th> <th>Size of sample</th> <th>Mean s</th> <th>S.D's</th> </tr> </thead> <tbody> <tr> <td>University A</td> <td>400</td> <td>55</td> <td>10</td> </tr> <tr> <td>University B</td> <td>100</td> <td>57</td> <td>15</td> </tr> </tbody> </table>					Size of sample	Mean s	S.D's	University A	400	55	10	University B	100	57	15
	Size of sample			Mean s	S.D's										
University A	400	55	10												
University B	100	57	15												
9	In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that the both rice and wheat are equally popular in this state at 1% level of significance? (Analyzing)	4	CO5												
10	In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from two populations? (Analyzing)	4	CO5												

UNIT- V : Stochastic process and Markov chains

1 MARK QUESTIONS		BT Level	Course Outcome
1	Define State space and parameter space. (Remembering)	1	CO6
2	Define stochastic process. (Remembering)	1	CO6
3	What are the formulae for the measure of Gambler's ruin in biased and unbiased cases? (Remembering)	1	CO6
4	Define the Markov process. (Remembering)	1	CO6
5	Define the Stochastic matrix. (Remembering)	1	CO6
6	What are the properties of stochastic matrix? (Remembering)	1	CO6
7	What is the condition for the regular and non-regular matrices? (Remembering)	1	CO6
8	Classify the stochastic process. (Understanding)	2	CO6
9	What is the formula for expected duration of the game? (Remembering)	1	CO6
10	Define the ergodicity? (Remembering)	1	CO6
10 MARK QUESTIONS		BT Level	Course Outcome
1	Find expected duration of the game (d_z) if $p=1/3, q=1/2, z=1$ and $a=1000$. (Remembering)	1	CO6
2	Consider the transition probability matrix(t p m) and show it in a graph, (Understanding) $\begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 1/3 & 0 & 2/3 & 0 & 0 \\ 0 & 1/3 & 0 & 2/3 & 0 \\ 0 & 0 & 1/3 & 0 & 2/3 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$	2	CO6
3	Which of the following are regular matrices? (Remembering) $i) \begin{pmatrix} 0 & 0 & 1 \\ 1/2 & 0 & 1/2 \\ 0 & 1 & 0 \end{pmatrix} \quad (ii) \begin{pmatrix} 1/2 & 1/4 & 1/4 \\ 0 & 1 & 0 \\ 1/2 & 0 & 1/2 \end{pmatrix} \quad iii) \begin{pmatrix} 1/2 & 1/2 & 0 \\ 1/2 & 1/2 & 0 \\ 1/4 & 1/4 & 0 \end{pmatrix}$	1	CO6
4	Consider the Markov chain with transition probability matrix and identify the matrix whether it is irreducible? (Applying) $\begin{pmatrix} 0.4 & 0.6 & 0 & 0 \\ 0.3 & 0.7 & 0 & 0 \\ 0.2 & 0.4 & 0.1 & 0.3 \end{pmatrix}$	4	CO6

	0 0 0 1		
5	<p>Which of the following are stochastic matrices? (Applying)</p> <p>i) $\begin{pmatrix} 1 & 0 \\ 1/2 & 1/2 \end{pmatrix}$ ii) $\begin{pmatrix} 1/2 & -1/2 \\ 1/4 & 3/4 \end{pmatrix}$ iii) $\begin{pmatrix} 1/3 & 2/3 & 4/3 \\ 1/2 & 1 & 1/2 \end{pmatrix}$</p>	4	CO6
6	<p>The transition probability matrix (t p m) is given as follows.</p> <p>Is the matrix irreducible? (Applying)</p> $\begin{pmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{pmatrix}$	4	CO6
7	<p>A training process considered as a two state Markov chain. If it rains, it is considered to be in state '0' and it does not rains is in the state of '1'. The transition probability of the Markov chain is defined by</p> <p>$\mathbf{P} = \begin{pmatrix} 0.6 & 0.4 \\ 0.2 & 0.8 \end{pmatrix}$ Find the probability that it will rain for 3 days from today assuming that it is raining today. (Remembering)</p>	1	CO6
8	<p>Three boys A, B and C are throwing a ball to each other. A always throw the ball to B and B always throws the ball to C: but C is just as likely to throw the ball to B as to A. Show that the process is the Markov chain. Find the transition matrix and classify the states. (Evaluating)</p>	5	CO6
9	<p>The transition probability matrix (t p m) of a markov chain{ X_n } 1,2,3,..... having three states 1,2, and 3 is $\mathbf{P} = \begin{pmatrix} 0.3 & 0.7 & 0 \\ 0.1 & 0.4 & 0.5 \\ 0 & 0.2 & 0.8 \end{pmatrix}$</p> <p>And the initial distribution is, $\mathbf{P}^0 = [0.7, 0.2, 0.1]$</p> <p>Find (i) $P\{ X_2=3 \}$ (ii) $P\{ X_3=2, X_2=3, X_1=3, X_0=2 \}$ (Remembering)</p>	1	CO6
10	<p>Explain briefly about the stochastic matrix and the Markov process. (Understanding)</p>	2	CO6

MODEL PAPER MID-I

3R20

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

D4

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)

II B.Tech - I Semester - I Mid Term Examinations

(R20MTH2103) Probability & statistical methods (Common to CSE)

Duration: 90Mins

Max Marks: 25M

Section – A

Answer All the questions

Marks: 5Qx1M = 5

1. Define Sample Space. **(Remembering)**
2. Write the statement of Baye's rule. **(Remembering)**
3. Write the Mean and Variance of Binomial Distribution. **(Remembering)**
4. Write the recurrence relation of Poisson distribution. **(Remembering)**
5. Define the uniform distribution of a continuous random variable. **(Remembering)**

Section – B

Answer any FOUR questions

Marks: 4Qx5M =

20M

6. Two dice are thrown. Let A be the event that the sum of the points on the faces is 9. Let B be the event that at least one number is 6.
Find i) $P(A \cup B)$ (ii) $P(A \cap B)$ (iii) $P(A^c \cup B^c)$. **(Remembering)**
7. A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red ball drawn is from the bag B. **(Remembering)**.
8. A random variables X has the following probability function

X	-3	-2	-1	0	1	2	3
P(x)	K	0.1	k	0.2	2k	0.4	2k

Find (i) k (ii) Mean (iii) variance **(Remembering)**

9. . If X is Poisson variate such that, $3P(x=4) = 0.5 P(x=2) + P(x=0)$ then find the men of X and $P(x \leq 2)$. **(Remembering)**
10. Let X denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine, (i) Discrete probability distribution, (ii) Expectation and (iii) variance **(Evaluation)**
11. In a Normal distribution 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution. **(Evaluation)**

MODEL PAPER MID-II

BR-20

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

D4

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)

II B.Tech - I Semester - I I Mid Term Examinations

(R20MTH2103) Probability & statistical methods (Common to CSE)

Duration: 90Mins

Max Marks: 25M

Section – A

Answer All the questions

Marks: 5Qx1M = 5M

1. Write the formula for the sample mean, sample variance. **(Remembering)**
2. What is finite population correction factor. **(Remembering)**
3. Define maximum likelihood estimation function. **(Remembering)**
4. Write the test statistic for difference of two proportions. **(Remembering)**
5. Define the Markov process. **(Remembering)**

Section – B

Answer any FOUR questions

Marks: 4Qx5M = 20M

6. Consider all the samples of size 2 are taken from population 3,6,9,15,27 with replacement. Then find
 - i) The populations mean.
 - ii) The population standard deviation.
 - iii) The mean of the sampling distribution of means.
 - iv) The standard deviation of the sampling distribution of means. **(Remembering)**
7. What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. **(Remembering)**
8. In a sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that the both rice and wheat are equally popular in this state at 1% level of significance? **(Analyzing)**
9. In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from two populations? **(Analyzing)**
10. Which of the following are regular matrices? **(Remembering)**
$$\left(\begin{array}{ccc} 0 & 0 & 1 \\ 1/2 & 0 & 1/2 \\ 0 & 1 & 0 \end{array} \right) \quad (ii) \left(\begin{array}{ccc} 1/2 & 1/4 & 1/4 \\ 0 & 1 & 0 \\ 1/2 & 0 & 1/2 \end{array} \right) \quad (iii) \left(\begin{array}{ccc} 1/2 & 1/2 & 0 \\ 1/2 & 1/2 & 0 \\ 1/4 & 1/4 & 0 \end{array} \right)$$
11. Three boys A, B and C are throwing a ball to each other. A always throw the ball to B and B always throws the ball to C: but C is just as likely to throw the ball to B as to A. Show that the process is the Markov chain. Find the transition matrix and classify the states. **(Evaluating)**

BR-
20

Subject Code: R20MTH2103

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

II B.Tech - II Semester – End Examinations model paper
PROBABILITY & STATISTICAL METHODS
(CSE)

Duration: 3 Hrs

Max Marks: 70M

Section – A

Answer All the following questions

Marks: 5Qx4M = 20M

- Two cards are drawn from a well shuffled pack of 52 cards. Find the probability of that they are both aces, if first card is
a) Replaced b) Not replaced
- Define Variance of (i) Discrete Random variable (ii) Continuous random variable.
(Remembering)
- Write the formula for the sample mean, sample variance. **(Remembering)**
- Explain the procedure of testing of hypothesis. **(Understanding)**
- Define a) Markov process b) Markov chain.

Section – B

Answer any FIVE questions choosing at least one from each Unit

Marks: 5Qx10M = 50M

UNIT - I

- If 2% of the light bulbs are defective, find
a) Atleast one is defective
b) Exactly 7 are defective
c) $P(1 < x < 8)$ in a sample of 100
(OR)
- If X is a normal variate with mean 30 and standard deviation 5. Find the probabilities that
a) $26 \leq X \leq 40$
b) $X \geq 45$

UNIT – II

- Find the mean and variance of the uniform probability distribution given by $f(x) = 1/n$ for $x=1,2,3,\dots,n$. **(Remembering)**

(OR)

- Construct a binomial distribution to the following data, **(Applying)**

X	0	1	2	3	4	5	6
f	13	25	52	58	32	16	4

UNIT - III

- In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation is 2.5, Assuming the distribution to be normal, find
(i) How many students score between 12 and 15?
(ii) How many score above 18

(iii) How many score below 18 (**Remembering**)

(OR)

11. Explain briefly t-distribution. (**Understanding**)

UNIT - IV

12. What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. (**Remembering**)

(OR)

13. The samples of students were drawn from two universities and from their weights in kilograms, means and standard deviations are calculated below. Make a large sample test to test the significance of the difference between the means. (**Creating**)

	Size of sample	Mean s	S.D's
University A	400	55	10
University B	100	57	15

UNIT - V

14. plain about stochastic process and its classifications.

(OR)

15. Which of the following are stochastic matrices?

- a) $\begin{pmatrix} 1 & 0 \\ 1/2 & 1/2 \end{pmatrix}$
- b) $\begin{pmatrix} 1/2 & -1/2 \\ 1/4 & 3/4 \end{pmatrix}$
- c) $\begin{pmatrix} 1/3 & 2/3 & 4/3 \\ 1/2 & 1 & 1/2 \end{pmatrix}$



Estd.2001

Sri Indu

College of Engineering & Technology

UGC Autonomous Institution

Recognized under 2(f) & 12(B) of UGC Act 1956,

NAAC, Approved by AICTE &

Permanently Affiliated to JNTUH



NAAC

NATIONAL ASSESSMENT AND
ACCREDITATION COUNCIL



HANDOUT

II Year I Semester
(R20CSE2102)

Computer Organization & Architecture

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2022-2023



SRIINDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

(Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi and Accredited by NBA, NAAC)
Sheriguda Village, Ibrahimpatnam Mandal, Ranga Reddy Dist. – 501 510

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

HANDOUT- INDEX

S. No	Contents
1	Vision, Mission, PEOs, PSOs, POs & Cos
2	Institution Academic Calendar
3	Department Academic Calendar
4	Subject wise
i)	Syllabus Copy
ii)	Lesson Plan
iii)	Question Bank
iv)	End Examination Questions (Previous 3 Academic Year)
v)	Mid-1 & Mid-2 Questions (Previous 3 Academic Year)



SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

VISION OF THE INSTITUTE

To be a premier institution in engineering & technology and management for competency, values and social consciousness.

MISSION OF THE INSTITUTE

- IM1:** Provide high quality academic programs, training activities and research facilities.
- IM2:** Promote continuous industry-institute interaction aimed at promoting employability, entrepreneurship, leadership and research aptitude among stakeholders.
- IM3:** Contribute to the economic and technological development of the region, state and nation.

VISION OF THE DEPARTMENT

To be a technologically adaptive centre for computing by grooming the students as top notch professionals.

MISSION OF THE DEPARTMENT

The Department has following Missions:

- DM1:** To offer quality education in computing.
- DM2:** To provide an environment that enables overall development of all the stakeholders.
- DM3:** To impart training on emerging technologies.
- DM4:** To encourage participation of stakeholders in research and development.

Program Educational Objectives(PEO's)

PEO1	Higher Studies: Graduate with an ability to pursue higher studies and get employment in reputed institutions and organizations.
PEO2	Domain Knowledge: Graduate with an ability to design and develop a product.
PEO3	Professional Career: Graduate with excellence by multidisciplinary approach to achieve successful professional career.
PEO4	Life Long Learning: Graduate with an ability to learn advanced skills to face professional competence through lifelong learning

Program Specific Outcomes(PSO's)

PSO1	To Develop software projects using standard practices and suitable programming environment.
PSO2	To identify, formulate and solve the real life problems faced in the society, industry and other areas by applying the skills of the programming languages, networks and databases learned.
PSO3	To apply computer science knowledge in exploring and adopting latest technologies in various inter- disciplinary research activities.

Program Outcomes(PO's)

PO1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design / Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSE OUTCOMES (CO's)

Academic Year: 2022-23

Class: II YEAR-I SEM.

Course Name: COMPUTER ORGANIZATION AND ARCHITECTURE (R20CSE2102)

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

Course Outcomes (COs)	
C212.1	Understand the basics of instructions sets and their impact on processor design
C212.2	Demonstrate an understanding of the design of the functional units of a digital computer system
C212.3	Evaluate cost performance and design trade-offs in designing and constructing a computer processor Including memory
C212.4	Design a pipeline for consistent execution of instructions with minimum hazards
C212.5	Recognize and manipulate representations of numbers stored in digital computers.
C212.6	Demonstrate the Characteristics of Multiprocessors.

COURSE ARTICULATION MATRIX

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C2102.1	3	2	-	-	3	-	2	-	-	-	-	2	2	3	2
C2102.2	3	3	-	2	2	-	-	-	-	-	-	-	3	3	2
C2102.3	3	3	-	2	2	-	2	-	-	-	-	-	3	3	2
C2102.4	3	2	3	2	-	-	2	-	-	-	-	-	3	2	1
C2102.5	3	3	3	3	2	-	-	-	3	-	-	-	3	3	1
C2102.6	3	3	3	3	-	-	2	-	3	-	-	-	3	3	1
C2102	3	2.6	3	2.6	2.2	-	2	-	3	-	-	2	2.8	2.8	1.5

3: High 2. Medium 1. Low

**COMPUTER ORGANIZATION
&
ARCHITECTURE**

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech - II Year – I Semester

L	T	P	C
2	0	0	2

(R20CSE2102)COMPUTER ORGANIZATION AND ARCHITECTURE

Course Objectives:

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors.

Course Outcomes:

- Understand the basics of instructions sets and their impact on processor design.
- Demonstrate an understanding of the design of the functional units of a digital computer system.
- Evaluate cost performance and design trade-offs in designing and constructing a computer processor Including memory.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Recognize and manipulate representations of numbers stored in digital computers

UNIT - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture.

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

UNIT – II

Micro programmed Control: Control memory, Address sequencing, micro program example, design of control unit.

Central Processing Unit: General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

UNIT - III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation.

Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT – IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory

UNIT – V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor.

Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor arbitration, Interprocessor Communication and Synchronization, Cache Coherence.

TEXT BOOK:

1. **Computer System Architecture – M. Moris Mano, Third Edition, Pearson/PHI**

REFERENCE BOOKS:

1. Computer Organization – Car Hamacher, Zvonks Vranesic, Safea Zaky, Vth Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

WEB-LINKS:

https://onlinecourses.nptel.ac.in/noc21_cs61/preview

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Department of Computer science and Engineering

FACULTY INDIVIDUAL TIME TABLE

Name of the Faculty: Dr. P. Epsiba
Designation: Associate Professor

AY: 2022-2023
Semester: I

Time	9:40 – 10:30	10:30 – 11:20	11:20 – 1:00		1:00 To 1:30	1:30 – 2:20	2:20 – 3:10	3:10 – 4:00
Days	1	2	3	4		5	6	7
Monday				IT				
Tuesday	IT					CSE		
Wednesday	CSE							
Thursday		IT	CSE					
Friday			IT					
Saturday				CSE				


S.NO.	SUBJECT CODE	SUBJECT	CLASS	No. of Hours
1	R20CSE2102	Computer Organization and Architecture	II YEAR CSE B	4
2			II YEAR IT	4

Faculty Signature


Head of the Department

	SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY LESSON PLAN (Regulation :R20) Department of Computer Science and Engineering		Prepared on Rev1: Page: 10 of 7		
	Sub. Code & Title	R20CSE2102 Computer Organization and Architecture			
	Academic Year: 2022-23		Year/Sem./Section	II-I-CSE	
	Faculty Name & Designation	Dr.P.Epsiba, Associate Professor/ECE			

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			From	To				
UNIT-I								
1	INTRODUCTION –DIGITAL COMPUTERS					15		
1.1	Digital Computers: Introduction	T1	1	11	Black board	01		CO1,L2
1.2	Block diagram of Digital Computer	T1	15	16	Black board	01		CO1,L6
1.3	Definition of Computer Organization, Computer Design and Computer Architecture.	T1	3	4	Black board	01		CO1,L1
1.4	Register Transfer Language and Micro operations: Register Transfer language.	T1	111	112	Black board	01		CO1,L2
1.5	Register Transfer	T1	112	115	Black board	01		CO1,L2
1.6	Bus and memory transfers	T1	115	119	Black board	01		CO1,L1
1.7	logic micro operations	T1	125	130	Black board	01		CO1,L3
1.8	shift micro operations	T1	130	133	Black board	01		CO1,L3
1.9	Arithmetic logic shift unit.	T1	133	135	Black board	01		CO1,L3
1.10	Basic Computer Organization and Design:	T1	141	144	Black board	01		CO1,L2
1.11	Computer Registers	T1	144	149	Black board	01		CO1,L1
1.12	Computer instructions	T1	149	153	Black board	01		CO1,L2
1.13	Timing and Control	T1	153	156	Black board	01		CO1,L1
1.14	Instruction cycle	T1	156	161	Black board	01		CO1,L4
1.15	Memory Reference Instructions, Input – Output and Interrupt.	T1	162	172	Black board	01		CO1,L4
	Review	Signature of the HOD/Coordinator						

	SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY LESSON PLAN (Regulation :R20) Department of Computer Science and Engineering			Prepared on Rev1: Page: 11 of 7	
	Sub. Code & Title		R20CSE2102 Computer Organization and Architecture		
	Academic Year: 2022-23		Year/Sem./Section	II-I	
	Faculty Name & Designation		Dr.P.Epsiba, Associate Professor/ECE		


Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			From	To				
UNIT-II								
2	Microprogrammed Control, Central Processing unit					10		
2.1	Microprogrammed Control: Control memory	T1	235	238	Black board	01		CO2,L1
2.2	Address sequencing	T1	238	16	Black board	01		CO2,L2
2.3	Micro program example	T1	242	4	Black board	01		CO2,L1
2.4	Design of control unit.	T1	253	112	Black board	01		CO2,L2
2.5	Central Processing Unit: General Register Organization,	T1	265	115	Black board	01		CO2,L1
2.6	** Stack Organization	T1	270	119	Black board	01		CO2,L2
2.7	Instruction Formats: Three Address Instructions, Two Address Instructions	T1	278	130	Black board	01		CO2,L3
2.8	Addressing modes	T1	283	133	Black board	01		CO2,L4
2.9	Data Transfer and Manipulation	T1	289	135	Black board	01		CO2,L1
2.10	Program Control.	T1	295	144	Black board	01		CO2,L1
	Review	Signature of the HOD/Coordinator						

	SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY LESSON PLAN (Regulation :R20) Department of Computer Science and Engineering		Prepared on Rev1: Page: 12 of 7		
	Sub. Code & Title	R20CSE2102 Computer Organization and Architecture			
	Academic Year: 2022-23		Year/Sem./Section	II-I	
	Faculty Name & Designation		Dr.P.Epsiba, Associate Professor/ECE		

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			From	To				
UNIT-III								
3	Data Representation, Computer Arithmetic					09		
3.1	Data Representation: Data types	T1	81	87	Black board	02		CO3,L2
3.2	Complements (r-1)'s Complement and (r's Complement)	T1	89	90	Black board	01		CO3,L3
3.3	Fixed Point Representation,	T1	91	95	Black board	01		CO3,L1
3.4	Floating Point Representation.	T1	97	97	Black board	01		CO3,L1
3.5	Computer Arithmetic: Addition and subtraction	T1	365	370	Black board	02		CO3,L3
3.6	Division Algorithms	T1	372	377	Black board	01		CO3,L3
3.7	Multiplication Algorithms	T1	372	377	Black board	01		CO3,L3
3.8	Floating – point Arithmetic operations.	T1	385	393	Black board	01		CO3,L3
3.9	Decimal Arithmetic unit	T1	395	398	Black board	01		CO3,L3
	Review	Signature of the HOD/Coordinator						

	SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY LESSON PLAN (Regulation :R20) Department of Computer Science and Engineering		Prepared on Rev1: Page: 13 of 7		
	Sub. Code & Title	R20CSE2102 Computer Organization and Architecture			
	Academic Year: 2022-23		Year/Sem./Section	II-I	
	Faculty Name & Designation		Dr.P.Epsiba, Associate Professor/ECE		

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			From	To				
UNIT-IV								
4	Input Output Organization, Memory Organization					09		
4.1	Input-Output Organization: Input-Output Interface	T1	413	421	Black board	01		CO4,L2
4.2	Asynchronous data transfer	T1	422	431	Black board	01		CO4,L1
4.3	Modes of Transfer	T1	433	437	Black board	01		CO4,L2
4.4	Priority Interrupt	T1	437	445	Black board	01		CO4,L1
4.5	Direct memory Access.	T1	446	448	Black board	01		CO4,L6
4.6	Discuss Memory Hierarchy, Main Memory	T1	479	490	Black board	01		CO4,L2
4.7	Auxiliary memory	T1	493	495	Black board	01		CO4,L1
4.8	Associate Memory	T1	495	500	Black board	01		CO4,L1
4.9	Cache Memory	T1	500	508	Black board	01		CO4,L1
	Review	Signature of the HOD/Coordinator						

	SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY LESSON PLAN (Regulation :R20) Department of Computer Science and Engineering		Prepared on Rev1: Page: 14 of 7		
	Sub. Code & Title	R20CSE2102 Computer Organization and Architecture			
	Academic Year: 2022-23		Year/Sem./Section	II-I-A & B	
	Faculty Name & Designation		Dr.P.Epsiba, Associate Professor/ECE		

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			From	To				
UNIT-V								
5	Reduced Instruction Set Computer, Pipeline and Vector Processing ,Multiprocessors					14		
5.1	Reduced Instruction Set Computer: CISC Characteristics,	T1,	304	305	Black board	01		CO5,L2
5.2	RISC Characteristics.	T1,	306	312	Black Board	01		CO5,L2
5.3	Pipeline & Vector Processing	T1,	323	328	Black board	01		CO5,L1
5.4	Parallel Processing,	T1,	323	328	Black board	01		CO5,L1
5.5	Pipelining, Arithmetic Pipeline,	T1,	329	336	Black board	01		CO5,L1
5.6	Instruction Pipeline,	T1,	337	343	Black board	01		CO5,L1
5.7	RISC Pipeline,	T1,	343	348	Black board	01		CO5,L1
5.8	Vector Processing,	T1,	348	354	Black board	01		CO5,L1
5.9	Array Processor	T1,	354	356	Black board	01		CO5,L2
5.10	Multi Processors: Characteristics of Multiprocessors,	T1,	529	531	Black board	01		CO6,L2
5.11	Interconnection Structures,	T1,	531	539	Black board	01		CO6,L5
5.12	Inter - Processor arbitration,	T1,	539	544	Black board	01		CO6,L1
5.13	Inter - Processor communication and synchronization,	T1,	545	548	Black board	01		CO6,L1
5.14	Cache Coherence.	T1,	550	553	Black board	01		CO6,L2
	Review	Signature of the HOD/Coordinator						

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TEXT BOOKS:

T1. Computer System Architecture – M. Moris Mano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:


R1. Computer Organization – Car Hamacher, Zvonks Vranesic, Safea Zaky, Vth Edition, McGraw Hill

R2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.

R3. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.

WEB LINKS: https://onlinecourses.nptel.ac.in/noc21_cs61/preview **ASSIGNMENT**

S.No.	Assignment Questions	Course Outcome	Books To be Referred
1	How to do address sequencing with diagram. (Understand)	CO1	T1
2.	What is instruction format? Explain the different instruction formats in detail.(Understand)	CO1	T1
3.	Explain the different phases of Instruction Cycle?(Understand)	CO1	T1
4.	Explain the Micro Program Control with Diagram & Examples?(Understand)	CO1	T1
5.	List out any 5 Registers with explains in detail. (Remember)	CO1	T1
6.	Explain general register organization in detail with neat diagrams(Understand)	CO2	T1
7.	Explain Stack organization in detail with neat diagrams(Understand)	CO2	T1
8.	Evaluate the following program using three address Instruction format $X = (A+B) * (C+D)$	CO2	T1
9.	Evaluate the following program using two address Instruction format $X = (A+B) * (C+D)$	CO2	T1
10.	Evaluate the following program using one address Instruction format $X = (A+B) * (C+D)$	CO2	T1

	SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY Question Bank (Regulation :R20) Department of CSE		Prepared on Rev1: Page: 16 of 7
	Sub. Code & Title	R20CSE2102 Computer Organization and Architecture	
	Academic Year: 2022-23	Year/Sem./Section	II-I
	Faculty Name & Designation	Dr.P.Epsiba, Associate Professor/ECE	

UNIT -1 Digital Computers				
1 MARK Questions L1-Remember L2-Understand L3-Apply L4-Analyze L5-Evaluate L6-Create			BT LEVEL	COURSE OUTCOME
1.	Define Computer Architecture. (Remember)		L1	CO1
2.	Define a Digital Computer. Draw block diagram of Computer. (Remember)		L1	CO1
3.	What is the need of Register? Write the different types of Registers?(Remember)		L1, L2	CO1
4.	Define Computer Design. (Remember)		L1	CO1
5.	Define Computer Organization. (Remember)		L1	CO1
6.	List the various representation of Register. (Remember)		L1	CO1
7.	What are the types of Memory Transfer? (Remember)		L1	CO1
8.	Define Micro operation. (Remember)		L1	CO1
9.	List the types of micro operation. (Remember)		L1	CO1
10.	Draw the circuit of Four Bit Binary Adder. (Remember)		L1	CO1
11.	Define Instruction code, Operation code and Accumulator. (Remember)		L1	CO1
12.	Define Instruction Cycle. (Remember)		L1	CO1
13.	List Computer Registers. (Remember)		L1	CO1
14.	Discuss Timing and Control Unit.(Understand)		L2	CO1
15.	What is instruction format and its types? (Remember)		L1	CO1
10 MARKS Questions				
1.	With the help of a block schematic explain the basic organizational units of a Digital computer. (Understand)		L2	CO1
2.	How to construct an ALU, which perform basic arithmetic and logic operations? (Create)		L6	CO1
3.	Explain the stored program organization with neat diagram. (Understand)		L2	CO1
4.	Detail the process involved in Register Transfer Language. (Understand)		L2	CO1
5.	Demonstrate the following. (Apply) <ol style="list-style-type: none"> 1. Bus and Memory Transfer 2. Three – State Bus Buffer with neat diagram 		L3	CO1
6.	Illustrate the Direct and Indirect addressing of basic computer. (Analyze)		L4	CO1
7.	List out any 5 Registers with explains in detail. (Remember, Understand)		L1, L2	CO1

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8.	Explain in Detail about Common Bus System for basic computer register. (Understand)	L2	CO1
9.	Explain the different instruction formats in detail. (Understand)	L2	CO1
10.	Draw and Explain the Control unit and Timing Diagram of Basic Computer? (Understand)	L2	CO1
11.	Explain the different phases of Instruction Cycle? (Understand)	L2	CO1
12.	Draw the flowchart for interrupt cycle and experiment with it with explanation (Remember)	L1	CO1
13.	Determine the input-output configuration. (Apply)	L3	CO1

Unit -II			
Micro programmed Control, Central Processing Unit			
1 MARK QUESTIONS			
1.	What is meant by Hardwired Control Unit? (Remember)	L1	CO2
2.	What is meant by Micro programmed control unit? (Remember)	L1	CO2
3.	Discuss the use of Dynamic microprogramming. (Understand)	L2	CO2
4.	Define Micro operations. (Remember)	L1	CO2
5.	Discuss the principle operation of micro programmed control unit. (Understand)	L2	CO2
6.	What is control memory? (Remember)	L1	CO2
7.	State the function of Micro instruction. (Remember)	L1	CO2
8.	What is Micro program, Microcode? (Remember)	L1	CO2
9.	Write example micro programs. (Understand)	L2	CO2
10.	Define control unit. (Remember)	L1	CO2
11.	Define Program Control. (Remember)	L1	CO2
12.	State the process involved in Mapping from instruction code to microinstruction address with example. (Remember)	L1	CO2
13.	Draw the microinstruction format for the control memory. (Understand)	L2	CO2
14.	What is processor unit & control unit of CPU? (Remember)	L1	CO2
15.	Identify the sub cycles in Basic instruction cycle. (Remember)	L1	CO2
16.	Draw the Instruction format with mode field. (Understand)	L2	CO2
17.	List the various types of CPU organizations. (Remember)	L1	CO2
18.	List the types of address instructions of several different lengths. (Remember)	L1	CO2
19.	Write the most commonly used addressing modes. (Remember)	L1	CO2
20.	What is Data Transfer Manipulation? Write the typical instructions used for data transfer? (Remember)	L1	CO2
10 MARK QUESTIONS			
1	Draw and explain about Micro program Control Organization. (Understand)	L2	CO2
2.	Explain in detail about the Address Sequencing process in Micro program control unit. (Understand)	L2	CO2
3.	Write short notes on (Remember) (i) Micro instruction format (ii) Symbolic micro instruction.	L1	CO2
4.	Explain general register organization in detail with neat diagrams. (Understand)	L2	CO2
5.	To illustrate the influence of the number of address on computer programs, we will evaluate the arithmetic statement $X=(A+B)*(C+D)$ using three address Instruction format. (Apply)	L3	CO2
6.	To illustrate the influence of the number of address on computer programs, we will	L3	CO2

[Type text]

	evaluate the arithmetic statement $X=(A+B)*(C+D)$ using two address Instruction format. (Apply)		
7.	To illustrate the influence of the number of address on computer programs, we will evaluate the arithmetic statement $X=(A+B)*(C+D)$ using one address Instruction format. (Apply)	L3	CO2
8	Explain in detail about various addressing modes. (Understand)	L2	CO2
9.	Explain the operations done through Data Transfer and Manipulation. (Understand)	L2	CO2
10.	Describe detail about Program control unit. (Understand)	L2	CO2

**Unit -III : Data Representation,
Computer Arithmetic**

1 MARK QUESTIONS

1.	What is mean by data representation? (Remember)	L1	CO3
2	Draw the typical internal data representation types? (Understand)	L2	CO3
3	Convert the following decimal number to the base indicated 7562 to octal 1938 to hexadecimal? (Apply)	L3	CO3
4.	Find the 1's and 2's complement of the following eight-digit binary number a. 10101110 b. 10000001? (Remember)	L1	CO3
5.	Write 3 ways of representing negative fixed point binary numbers in addition and subtraction. (Remember)	L1	CO3
6.	Draw flow chart for add and subtract operations. (Understand)	L2	CO3
7.	List the steps of Booth's Multiplication algorithm? (Remember)	L1	CO3
8.	Convert the following decimal number to the base indicated 17562 to octal 11938 to hexadecimal. (Apply)	L3	CO4
9.	Define decimal arithmetic unit. (Remember)	L1	CO4
10.	List out computer arithmetic operations. (Remember)	L1	CO4
11.	Design division algorithm.(Create)	L6	CO4
12.	Write about floating point arithmetic. (Remember)	L1	CO4
13.	Define BCD adder and Sub-tractor. (Remember)	L1	CO4

10 MARKS QUESTIONS

1.	Draw and explain the hardware for signed – magnitude addition and subtraction. (Understand)	L2	CO3
2.	Explain in detail about addition and subtraction with signed 2's complement data. (Understand)	L2	CO3
3.	Explain the booth's multiplication algorithm with neat sketch of hardware design. (Understand)	L2	CO3

[Type text]

4.	Perform division process of fixed point binary number in signed-magnitude representation 10001 and 01110 using restoring division algorithm. (Apply)	L3	CO4
5.	Explain in detail about floating point arithmetic operations.	L2	CO4
6.	Draw a flowchart for adding and subtracting two fixed point binary numbers where negative numbers are signed 1's complement presentation. (Understand)	L2	CO4
7.	Draw the flowchart for divide operation and explain. (Understand)	L2	CO4
8.	Draw and explain the one stage decimal arithmetic unit. (Understand)	L2	CO4
9.	Explain in detail about the derivation of BCD adder. (Understand)	L2	CO4

Unit-IV : Input Output Organization, Memory Organization

1 MARK QUESTIONS

1	What is the need of IO Interface.? (Remember)	L1	CO5
2	What is DMA? (Remember)	L1	CO5
3.	Define Priority Interrupt. (Remember)	L1	CO5
4.	List out any 5 IO Devices. (Remember)	L1	CO5
5.	What are peripheral devices? Give a note on video monitors. (Remember)	L1	CO5
6.	Discuss Asynchronous Data. (Understand)	L2	CO5
7	What are the three possible modes of data transfer? (Remember)	L1	CO5
8	List out the memory hierarchy. (Remember)	L1	CO5
9	What is IoP? (Remember)	L1	CO5
10	What is mean by memory management system? (Remember)	L1	CO5
11	Define main memory. (Remember)	L1	CO5
12	Define auxiliary memory. (Remember)	L1	CO5
13	Define associate memory. (Remember)	L1	CO5
14	Draw block diagram of associate memory. (Understand)	L2	CO5
15	What are the three types of mapping procedures in cache memory? (Remember)	L1	CO5

10 MARKS QUESTIONS

1	Explain in detail about Input and output interface with example. (Understand)	L2	CO5
2	What is asynchronous data transfer? Explain the different types of Asynchronous data transfer techniques. (Remember) (Understand)	L1, L2	CO5
3	Explain the following data transfer modes/techniques. (Understand) a) Program Controlled IO b) Interrupt Initiated IO c) Direct memory access (DMA)	L2	CO5
4	Explain the communication between IOP and CPU. (Understand)	L2	CO5
5	Explain in detail about DMA operation with neat diagram. (Understand)	L2	CO5
6	Write a note on memory hierarchy with the neat diagram. (Remember)	L1	CO5
7	Explain with neat sketch auxiliary memory. (Understand)	L2	CO5
8	Explain in detail about associative memory mechanisms. (Understand)	L2	CO5
9	Explain in detail about Cache memory mechanisms. (Understand)	L2	CO5
10	Describe in brief the different modes by which data transfer can take place between a computer unit and its I/O devices. What is the difference between synchronous and asynchronous data transfer? (Understand) (Evaluate)	L2, L5	CO5

Unit-V: Reduced Instruction Set Computer Pipeline & Vector Processing ,Multiprocessors

1 MARK QUESTIONS

1.	Define RISC & CISC. (Remember)	L1	CO6
2	Discuss the difference between RISC & CISC. (Evaluate)	L5	CO6
3	Define a Pipeline. Give an example. (Remember)	L1	CO6
4	Define arithmetic pipeline. (Remember)	L1	CO6
5	What is mean by instruction pipeline? (Remember)	L1	CO6
6	Mention the instruction cycle of instruction pipeline. (Remember)	L1	CO6
7	Define RISC pipeline. (Remember)	L1	CO6
8	List out pipelining types. (Remember)	L1	CO6
9	Define Vector Processing. (Remember)	L1	CO6
10	Define multiprocessor. (Remember)	L1	CO6

10 MARKS QUESTIONS

1	Explain in detail about the RISC Characteristics. (Understand)	L2	CO6
2	Explain in detail about the CISC Characteristics (Understand)	L2	CO6
3	Explain the different types of Pipeline techniques. (Understand)	L2	CO6
4	Explain in detail about the Instruction Pipeline. (Understand)	L2	CO6
5	Explain in detail about basic multiprocessor architecture. (Understand)	L2	CO6
6	List the Characteristics of Multiprocessors. Explain in detail about the Interconnection structures of Multiprocessor. (Remember) (Understand)	L1, L2	CO6
7	Explain in detail about the Inter processor arbitration. (Understand)	L2	CO6
8	Describe in detail about inter process communication and synchronization.	L2	CO6

MID QUESTION PAPERS
&
END SEMESTER QUESTION PAPERS

BR-20

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
IIB.Tech - I Semester - II Mid Term Examination, February – 2022
(R20CSE2102) COMPUTER ORGANIZATION and ARCHITECTURE

D4

(For CSE, CS, AIML, DS, CSIT and IT)

Duration: 90 Mins**Dt: 15-02-2022, Day-2 (AN)****Max Marks: 25M****Section – A****Answer All the questions****Marks: 5Qx1M = 5M**

* (L1-Remembering, L2-Understanding, L3-Appling, L4-Analyzing, L5-Evaluating, and L6-Creating.)

1. Explain floating point arithmetic.
2. Discuss Asynchronous Data.
3. Explain Main Memory.
4. Define a Pipeline. Give an example.
5. Define RISC & CISC.

<u>*Blooms Taxonomy Levels</u>	<u>Course Outcomes</u>
(L2)	CO3
(L2)	CO4
(L2)	CO3
(L2)	CO4
(L1)	CO6

Section – B**Answer any FOUR questions****Marks: 4Qx5M = 20M**

6. Draw the flowchart for divide operation and explain.
7. Explain the following data transfer modes/techniques.
 - a)Program Controlled IO.
 - b)Interrupt Initiated IO.
8. Write a note on memory hierarchy with the neat diagram.
9. Explain in detail about Associative memory mechanisms.
10. Explain in detail about the RISC Characteristics.
11. What is Multiprocessors? Explain in detail.

(L2)	CO3
(L2)	CO4
(L2)	CO3
(L2)	CO3
(L2)	CO6
(L1)	CO6

BR-20

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

D4

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)

II B.Tech - I Semester - I Mid Term Examinations (Model paper)

(R18CSE2102) COMPUTER ORGANIZATION & ARCHITECTURE - (Common to CSE & IT)

Duration: 90Mins

Max Marks: 25M

Section – A

Answer All the questions

5Qx1M = 5M

- 1) Define Computer Architecture.
- 2) Explain data representation?
- 3) What is control memory?
- 4) Define control unit.
- 5) Find the 1's and 2's complement of the following eight digit binary number.
 - a. 10101110
 - b. 10000001

Section – B

Answer any FOUR questions

4Qx5M = 20M

- 1) Explain about Von Neumann architecture?
- 2) Draw the flowchart for interrupt cycle and experiment with it with explanation?
- 3) Evaluate the following program using three address Instruction format
 $X = (A+B) * (C+D)$?
- 4) Explain multiple bus organization in detail?
- 5) Explain the booth's algorithm with neat sketch of hardware design?

II B.Tech - I Semester - II Mid Term Examinations (Model paper)**(R18CSE2102) COMPUTER ORGANIZATION & ARCHITECTURE - (Common to CSE & IT)****Duration: 90Mins****Max Marks: 25M****Section – A****Answer All the questions****5Qx1M = 5M**

1. List out the steps of Booth's algorithm.
2. Define Priority Interrupt.
3. Define Cache Memory, Auxiliary Memory, Associate Memory.
4. Differentiate between the RISC & CISC?
5. Explain Vector Processing?

Section – B**Answer any FOUR questions****4Qx5M = 20M**

1. Explain about Von Neumann architecture?
2. Evaluate the following program using one address Instruction format
 $X = (A+B) * (C+D)$?
3. Describe in brief the different modes by which data transfer can take place between a computer unit and its I/O devices. What is the difference between synchronous and asynchronous data transfer?
4. Explain the different types of Pipeline techniques?
5. Write the Characteristics of Multiprocessors. Explain in detail about the Interconnection structures of Multiprocessor?

Subject Code: R20CSE2102

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi) Recognized under 2(f) and 12(B) of UGC Act 1956

II B.Tech - I Semester –End Examinations (Model paper)

COMPUTER ORGANIZATION & ARCHITECTURE- (Common to CSE &IT)

Duration: 3 Hrs

Max Marks: 70M

Section – A

Answer All the following questions

Marks: 5Qx4M = 20M

1. Define Computer Architecture.
2. What is Floating Point Representation?
3. Find the 1's and 2's complement of the following eight digit binary number?
 - a. 10101110
 - b. 10000001
4. Explain Modes of transfer?
5. Differentiate between the RISC & CISC?

Section – B

Answer any FIVE questions choosing at least one from each Unit

Marks: 5Qx10M = 50M

UNIT - I

6. Explain the stored program organization with neat diagram?
(OR)
7. Draw the flowchart for interrupt cycle and experiment with it with explanation?

UNIT - II

8. Evaluate the following program using one address Instruction format
 $X = (A+B) * (C+D)$?
(OR)
9. Draw and explain typical hardware control unit?

UNIT - III

10. Perform division of 1000 and 0011 using restoring division algorithm?
(OR)
11. Explain floating point arithmetic?

UNIT - IV

12. Describe in brief the different modes by which data transfer can take place between a computer unit and its I/O devices. What is the difference between synchronous and asynchronous data transfer?
(OR)
13. Write a note on memory hierarchy with the neat diagram?

UNIT - V

14. Write the Characteristics of Multiprocessors. Explain in detail about the Interconnection structures of Multiprocessor?
(OR)
15. Explain the different types of Pipeline techniques?



Estd.2001

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College of Engineering & Technology

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NATIONAL ASSESSMENT AND
ACCREDITATION COUNCIL



HANDOUT

Second Year CSE - Semester I

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2022-23

DEPARTMENT OF COMPUTER SCIENCE AND
ENGINEERING

HANDOUT- INDEX

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1	Vision, Mission, PEOs, POs, PSOs & COs
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4	Subject wise
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SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH –COMPUTER SCIENCE AND ENGINEERING

INSTITUTION VISION

To be a premier Institution in Engineering & Technology and Management with competency, values and social consciousness.

INSTITUTION MISSION

- IM₁** Provide high quality academic programs, training activities and research facilities.
- IM₂** Promote Continuous Industry-Institute interaction for employability, Entrepreneurship, leadership and research aptitude among stakeholders.
- IM₃** Contribute to the economical and technological development of the region, state and nation.

DEPARTMENT VISION

To be a technologically adaptive center for computing by grooming the students as top notch professionals.

DEPARTMENT MISSION

The Department has following Missions:

- DM1:** To offer quality education in computing.
- DM2:** To provide an environment that enables overall development of all the stakeholders.
- DM3:** To impart training on emerging technologies.
- DM4:** To encourage participation of stakeholders in research and development.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- PEO1: Higher Studies:** Graduate with an ability to pursue higher studies and get employment in reputed institutions and organizations.
- PEO2: Domain Knowledge:** Graduate with an ability to design and develop a product.
- PEO3: Professional Career:** Graduate with excellence by multidisciplinary approach to achieve successful professional career.
- PEO4: Life Long Learning:** Graduate with an ability to learn advanced skills to face professional competence through life long learning

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design / development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	The engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological Change
Program Specific Outcomes	
PSO 1	To Develop software projects using standard practices and suitable programming environment.
PSO 2	To identify, formulate and solve the real life problems faced in the society, industry and other areas by applying the skills of the programming languages, networks and databases learned.
PSO 3	To apply computer science knowledge in exploring and adopting latest technologies in various inter- disciplinary research activities.

DATA STRUCTURES (R20CSE2101)

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

Course Outcomes	Statements
C212.1	Select the data structures that efficiently model the information in a problem. (Apply)
C212.2	Ability to assess efficiency trade-offs among different data structure implementations or combinations. (Analyze)
C212.3	Implement and know the application of algorithms for sorting and searching. (Analyze)
C212.4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees (Apply)
C212.5	Ability to select the data structures that efficiently model the information in a problem (Analyze)
C212.6	Illustrate the concept of Text pattern matching algorithm (Evaluate)

Course Articulation Matrix:

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
C212.1	3	-	-	-	3	-	-	1	-	-	-	-	2	-	-
C212.2	1	3	3	-	-	-	-	1	-	-	-	-	-	2	-
C212.3	2	3	3	1	-	-	-	-	-	-	-	1	-	-	-
C212.4	3	2	2	2	3	-	-	1	-	-	-	-	-	3	-
C212.5	-	2	3	-	1	-	-	1	1	-	-	2	-	-	-
C212.6	1	-	-	3	-	-	-	-	1	-	-	2	2	-	2
C212	2	2.5	2.75	2	2.33	-	-	1	1	-	-	1.66	2	2.5	2



LR.NO.SICET/AUTO/DAE/BR-20/ACADEMIC-CAL/320/2022

DATE: 05.09.2022

II B.TECH ACADEMIC CALENDAR
ACADEMIC YEAR : 2022-2023

Dr. G. SURESH,
Principal,

To,
All the HODs
Sir,

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for
II B.Tech - I & II Semester for the academic year **2022-23** - Reg.

The approved Academic Calendar for **II B.Tech - I & II Semester** for the academic year **2022-23** is given below:

ACADEMIC CALENDAR - II B.TECH - I & II SEMESTER
ADMITTED BATCH - 2021-2022 of BR-20 Regulation.

I SEMESTER

SNO	EVENT	PERIOD	DURATION
1.	Commencement I Sem of Class Work	26-09-2022	
2.	Instructions/Class Work for II B.Tech I Sem.	26.09.2022 - 21.01.2023	17 Weeks
3.	Dussehra Holidays	03.10.2022 - 06.10.2022	4 Days
4.	I Mid Examinations for II B.Tech I Sem.	28.11.2022 - 30.11.2022	3 Days
5.	II Mid Examinations for II B.Tech I Sem.	23.01.2023 - 25.01.2023	3 Days
6.	Preparation Holidays & Practical Lab Examinations	26.01.2023 - 01.02.2023	1 Week
7.	Remedial Mid Test (RMT).	02.02.2023 - 04.02.2023	3 Days
8.	II B.Tech I Semester End Examinations.	06.02.2023 - 18.02.2023	2 Weeks
Commencement of Class-Work for II B.Tech - II Semester 20.02.2023.			

II SEMESTER

SNO	EVENT	PERIOD	DURATION
1.	Commencement of II Sem Class Work.	20.02.2023	
2.	Instructions/Class Work for II B.Tech II Sem. (Including Summer Vacation)	20.02.2023 - 24.06.2023	18 Weeks
3.	I Mid Examinations for II B.Tech. II Sem.	17.04.2023 - 19.04.2023	3 Days
4.	Summer Vacation	15.05.2023 - 27.05.2023	2 Weeks
5.	II Mid Examinations for II B.Tech. II Sem.	26.06.2023 - 28.06.2023	3 Days
6.	Preparation Holidays & Practical Lab Examinations.	29.06.2023 - 05.07.2023	1 Week
7.	Remedial Mid Test (RMT).	06.07.2023 - 08.07.2023	3 Days
8.	II B.Tech. II Semester End Examinations.	10.07.2023 - 22.07.2023	2 Weeks
Commencement of Class Work for III B.Tech - I Semester - 24.07.2023			

Vusa
ACE

Suresh
CE 5/9/22

OSR
DIRECTOR
DIRECTOR

Sood
PRINCIPAL
PRINCIPAL

Copy to: All the Heads of the Depts. & A.D.S.

CONTROLLER OF EXAMINATIONS

Sri Indu College of Engineering & Technology

DIRECTOR (Academic Audit)

Sri Indu College of Engineering & Technology

Sri Indu College of Engineering & Technology

(An Autonomous Institution Under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R. Dist-501510

DATA STRUCTURES

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech. - II Year – I Semester

L	T	P	C
3	0	0	3

(R20CSE2101) Data Structures

Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
- Introduces sorting and pattern matching algorithms

UNIT - I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

UNIT - II

Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT - III

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

UNIT - IV

Graphs: Graph Implementation Methods. Graph Traversal Methods. Sorting: Heap Sort, External Sorting- Model for external sorting, Merge Sort.

UNIT - V

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

TEXTBOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOKS:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning. R20 B.TECH.



SRI INDU COLLEGE OF ENGG & TECH
LESSON PLAN

(Regulation :R20)

Department of Computer Science and Engineering

R20

Sub. Code & Title	R20CSE2101 Data Structures		
Academic Year: 2022-2023	Year/Sem./Section	II-I/A,B,C,D	
Faculty Name & Designation	Dr.Kishore Verma , Mrs. A. Ramya		

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT	
			From	To					
UNIT-I									
I	Introduction					16			
1.1	Introduction to Data Structures	R1	3	8	Black board	02		CO1, L1	
1.2	Abstract data types	R1	9	15	Black board	01		CO1, L1	
1.3	Linear list – singly linked list implementation	R1	193	194	PowerPoint Presentation	02		CO1, ,L2	
1.4	Insertion, deletion and searching operations on linear list	R1	195	212	Black board	02		CO1, L2	
1.5	Stacks-Operations, stack applications	R1	80	81	MODEL	02		CO1,L2	
1.6	Array and linked representations of stacks	R1	83	89	Black board	02		CO1, L1	
1.7	Queues-operations	R1	148	150	Black board	01		CO1, L2	
1.8	Queues using array	R1	150	150	Black board	02		CO1,L2	
1.9	Queues using Linked list	R1	151	158	Black board	02		CO1,L1	
	Review	Signature of the HOD/Coordinator							
UNIT -II									
II	Dictionaries					10			
2.1	Dictionaries: linear list representation	T1	395	395	Black board	01		CO2, L1	
2.2	skip list representation	T1			Black board	01		CO 2, L1	
2.3	operations - insertion, deletion and searching	T1			Power point Presentation	01		CO 2, L2	
2.3	Hash Table Representation: hash functions	R1	397	398	Power point Presentation	01		CO 2, L2	
2.4	collision resolution-separate chaining	R1	620	621	Black board	02		CO2, L2	
2.5	open addressing-linear probing	R1	623	624	Black board	02		CO 2, L3	
2.6	quadratic probing, , double hashing	R1	625	625	Black board	01		CO2, L3	
2.7	Rehashing, extendible hashing	R1			Black board	01		CO 2, L2	
	Review	Signature of the HOD/Coordinator							



SRI INDU COLLEGE OF ENGG & TECH

LESSON PLAN

(Regulation :R20)

Department of Computer Science and Engineering

R20

Sub. Code & Title

R20CSE2101 Data Structures

Academic Year: 2022-2023


Year/Sem./Section

II-I/A,B,C,D

Faculty Name & Designation

**Dr.Kishore Verma ,
Mrs. A. Ramya**

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
UNIT- III								
III	Search Trees					09		
3.1	Search Trees: Binary Search Trees, Definition	T1	226	226	Seminar	02		CO4,L3
3.2	Implementation, Operations- Searching, Insertion	T1	227	228	Black board	01		CO3, L4
3.3	Deletion of elements	T1	230	231	Black board	01		CO3,L3
3.4	AVL Trees, Definition, Height of an AVL Tree	R1	341	342	Power point Presentation	01		CO3, L4
3.5	Operations – Insertion, Deletion and Searching,	R1	348	348	Black board	01		CO4, L4
3.6	Deletion and Searching,	R1	349	351	Black board	01		CO4, L3
3.7	Red –Black	T1	518	525	Black board	01		CO4, L3
3.8	Splay Trees	T1	542	542	Black board	01		CO4, L3
	Review	Signature of the HOD/Coordinator						
UNIT- IV								
IV	Graphs					09		
4.1	Graphs: Graph Implementation	T1	257	263	Black board	01		CO4, L2
4.2	Graph Traversal Methods	T1	272	273	Black board	02		CO4, L2
4.3	Sorting: Heap Sort	T1	347	347	Black board	02		CO3, L4
4.4	External Sorting	T1	372	372	Black board	01		CO3, L4
4.5	Model for external sorting	T1	376	376	Power point Presentation	02		CO3, L2
4.6	Merge Sort	T1	335	335	Black board	01		CO3, L4
	Review	Signature of the HOD/Coordinator						
UNIT- V								
V	Pattern Matching and tries					07		
5.1	Pattern Matching and Tries	T1	557	561	Black board	01		CO6,L3
5.2	the Boyer –Moore algorithm	W6	-	-	Power point Presentation	01		CO6, L4
5.3	the Knuth-Morris-Pratt algorithm	W7	-	-	Power point Presentation	02		CO6, L4
5.4	Standard Tries	W8	-	-	Black board	01		CO6, L6
5.5	Compressed Tries	W8	-	-	Black board	01		CO6, L6
5.6	Suffix tries	W8	-	-	Black board	01		CO6, L6
	Review	Signature of the HOD/Coordinator						

	SRI INDU COLLEGE OF ENGG & TECH LESSON PLAN (Regulation :R20) Department of Computer Science and Engineering		R20
	Sub. Code & Title	R20CSE2101 Data Structures	
	Academic Year: 2022-2023	Year/Sem./Section	II-I/A,B,C,D
	Faculty Name & Designation	Dr. Kishore Verma , Mrs. A. Ramya	

LIST OF TEXT BOOKS AND REFERENCES

TEXT BOOKS:


- T1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
- T2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

REFERENCE BOOK:

- R1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage.

WEB LINKS

- W1 . <https://nptel.ac.in/noc/courses/noc18/SEM1/noc18-cs25/>
- W2 . <https://nptel.ac.in/courses/106/105/106105085/>
- W3 . <https://nptel.ac.in/courses/106/105/106105085/>
- W4 . <https://www.coursera.org/specializations/data-structures-algorithms>
- W5 . <https://www.edx.org/course/data-structures-fundamentals>
- W6 <https://www.geeksforgeeks.org/boyer-moore-algorithm-for-pattern-searching/>
- W7 <https://www.geeksforgeeks.org/kmp-algorithm-for-pattern-searching/>
- W8 <https://www.geeksforgeeks.org/types-of-tries/>

	SRI INDU COLLEGE OF ENGG & TECH LESSON PLAN (Regulation :R20) Department of Computer Science and Engineering			R20
	Sub. Code & Title	R20CSE2101 Data Structures		
	Academic Year: 2022-2023	Year/Sem./Section	II-I/A,B,C,D	
	Faculty Name & Designation	Dr. Kishore Verma , Mrs. A. Ramya		

CONTENT BEYOND THE SYLLABUS

S.No	Topics	Proposed Actions	Date	Resource Person/Mode	POs	PSOs
1	Binary Tree , Terminology and B+ Tree	NPTEL		Dr kishore verma	PO1,PO4	PSO1
2	List implementation using Array	NPTEL		Dr kishore verma	PO1	PSO1

ASSIGNMENT I & II

S.No.	Assignment Questions	Course Outcome	Books To be Referred	Date Of Announcement	Date Of Submission
I.	Explain the following data structures operations? a) Stack operations b) Queue operations	CO1	T2	11.12.22	13.12.22
2.	Describe Linked list? Distinguish between array and linked list?	CO1	T2	11.12.22	13.12.22
3.	Discuss the term Dictionary? What are the various applications of Dictionary and Hashing?	CO2	T2	11.12.22	13.12.22
4.	What are the various types of hash functions?	CO2	T1	11.12.22	13.12.22
5.	Write a procedure to perform insertion deletion and searching in Binary search tree?	CO4	T1	11.12.22	13.12.22
6.	a) Develop a program to insert the elements into AVL tree? b) Construction of AVL tree step by step with diagrams for the list {25,30, 35, 40, 50, 55, 60, 65, 70, 75}	CO4	T2	10.02.23	12.2.23
7.	Explain Breadth first search traversal with example?	CO3	T2	10.02.23	12.2.23
8.	Discuss about merge sort technique with suitable example?	CO3	T2	10.02.23	12.2.23



SRI INDU COLLEGE OF ENGG & TECH
LESSON PLAN
 (Regulation :R20)

R20

Department of Computer Science and Engineering

Sub. Code & Title	R20CSE2101 Data Structures		
Academic Year: 2022-2023	Year/Sem./Section	II-I/A,B,C,D	
Faculty Name & Designation	Dr. Kishore Verma , Mrs. A. Ramya		

S.No.	Assignment Questions	Course Outcome	Books To be Referred	Date Of Announcement	Date Of Submission
9.	Write and explain Boyer Moore pattern matching algorithm?	CO6	T2	10.02.23	12.2.23
10.	Calculate the failure function (or) prefix table in a search string "ABACAABADCBACABAA BB".	CO6	T2	10.02.23	12.2.23

SELF STUDY TOPICS

S.No.	Topics	Books & Journals	Course Outcomes
1	Quick sort	Data structures through c by "yashvanth kanetkar"	CO1,CO3
2	Circular queue	Data structures through c by "yashvanth kanetkar"	CO1,CO2



SRI INDU COLLEGE OF ENGG & TECH
QUESTIONBANK
 (Regulation :R20)
 Department of Computer Science and Engineering

(Regulation :R20)

Sub. Code & Title	R20CSE2101 Data Structures		
Academic Year: 2022-2023	Year/Sem./Section	II-I/A,B,C,D	
Faculty Name & Designation	Dr. Kishore Verma , Mrs. A. Ramya		

QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)

(1. Remembering 2. Understanding 3. Applying 4. Analyzing 5. Evaluating 6. Creating)

UNIT I				
PART A				
1 MARK QUESTIONS			BT LEVEL	COURSE OUTCOME
1	Define a data structure? Mar 2018		1	CO1
2.	Define Linear data structure? Dec 2016		1	CO1
3.	Describe Non Linear data structure?		2	CO1
4.	Write about abstract data type? Nov 2018		3	CO1
5.	Define Stack? DEC 2012		1	CO1
6.	Describe Queue? Oct 2018		2	CO1
7.	Describe Linked list? Nov 2019		2	CO1
8	Explain the advantages and disadvantages of linked list ?		2	CO1,CO2
9	What are the advantages and disadvantages of arrays? Oct 2016		1	CO1
10	Explain the applications of Linked list? DEC 2017		2	CO1
PART B				
10 MARKS QUESTIONS				
1	Discuss about implementation of single linked list.? Oct 2019		2	CO1
2	Write a program to implement single linked list? Dec 2016		6	CO1,CO2
3	Explain the following data structures a)stack operations b)Queue operations		2	CO1
4	Write about Stack representation using array and linked list? July 2021 Nov 2019		3	CO1,CO2
5	Write about Queue representation using array and linked list? Mar 2021		3	CO1,CO2
6	Write a program to implement stack using Linked list?		6	CO1,CO2
7	Write a program to implement Queue using array? Oct 2020		6	CO1,CO2
8	Explain about Stack applications and Queue applications.		2	CO1,CO2
9	Describe Linked list? Distinguish between array and linked list? Mar 2018		4	CO1
10	Explain about following a) Data structure b) Abstract Data Type c) Linear data structure d) Non Linear Data structure		2	CO1



**SRI INDU COLLEGE OF ENGG & TECH
QUESTIONBANK**

(Regulation :R20)

(Regulation :R20)

Department of Computer Science and Engineering

Sub. Code & Title

R20CSE2101 Data Structures

Academic Year: 2022-2023

Year/Sem./Section

II-I/A,B,C,D

Faculty Name & Designation

**Dr. Kishore Verma ,
Mrs. A. Ramya**

UNIT II

PART A

1 MARK QUESTIONS

		BT LEVEL	COURSE OUTCOME
1	Describe Dictionary? Mar 2020	1	CO1,CO2
2.	What is Hash Function? DEC 2016	1	CO2
3.	Write about Linear Probing and Quadratic Probing? Dec 2016	3	CO2
4.	Define collision?	3	CO1,CO2
5.	Describe skip list? Nov 2019	2	CO1,CO2
6.	List the collision resolution techniques? OCT 2020	1	CO1,CO2
7.	Define chaining?	1	CO2
8	Define double hashing? Dec 2017	1	CO2
9	What is the use of rehashing technique?	3	CO2
10	What is the use extensible hashing?	3	CO2

PART B

10 MARKS QUESTIONS

1	What are the two methods of representing Liner list? Explain with example DEC 2012	1	CO2
2	Write about Hash table and Hash function? DEC 2016	3	CO2
3	What are the various types of hash functions?	1	CO2
4	Demonstrate skip list representation and its node structure with example? Oct 2021 Nov 2019	3	CO2
5	Explain a) How does collision occur? Mar 2021 Oct 2020 b) Explain chaining and open addressing methods for detecting collision and overflow?	2	CO1,CO2
6	Write about following collision handling techniques? a) Quadratic Probing b) Double hashing Mar 2021	3	CO2
7	Discuss about the Rehashing Technique and its advantages?	2	CO2
8	Explain the concept of extensible hashing with suitable example	2	CO2
9	What is hashing? Explain the differentiation between hashing and skip list? DEC 2013	2	CO2
10	Discuss the term Dictionary? What are the various applications of Dictionary and Hashing?	3	CO1,CO2



**SRI INDU COLLEGE OF ENGG & TECH
QUESTIONBANK**

(Regulation :R20)

(Regulation :R20)

Department of Computer Science and Engineering

Sub. Code & Title

R20CSE2101 Data Structures

Academic Year: 2022-2023

Year/Sem./Section

II-I/A,B,C,D

Faculty Name & Designation

**Dr. Kishore Verma ,
Mrs. A. Ramya**

UNIT III

PART A

1 MARK QUESTIONS

		BT LEVEL	COURSE OUTCOME
1	Define a Binary Search tree? How do we represent it? July 2021	1	CO1.CO3
2.	List the operations in Binary Search Tree? Mar 2021	1	CO3
3.	What is an AVL Tree? Give one example? Nov 2019	1	CO3
4.	Write short notes on Balance factor in AVL tree?	3	CO3
5.	Differentiate AVL tree and Binary search tree? DEC 2015	4	CO1,CO3
6.	What are the applications of AVL tree?	1	CO3
7.	List the rotations in AVL tree?	1	CO3
8	Write the disadvantages of Binary search tree?	3	CO3
9	List the rules of Red-Black Tree? Dec 2016	1	CO1,CO3
10	What is Splay tree? OCT 2020	1	CO1,CO3

PART B

10 MARKS QUESTIONS

1	Write a procedure to perform insertion deletion and searching in Binary search tree? Dec 2017,Dec 2016	6	CO2,CO3
2	Explain in detail deletion of an element in BST in different cases?	2	CO1,CO4
3	Write a program to perform following operations in Binary search tree? a) Insert an element into a binary search tree b) Delete an element from a binary search tree OCT 2020	6	CO1,CO4
4	Define Binary search tree? Construct binary search tree step by step with diagrams using list of numbers {4,5,1,2,9,7,3,6,10,12,11}. July 2021	6	CO1,CO4
5	Describe AVL Tree? Illustrate different rotations in AVL tree for balancing with appropriate example? Nov 2019	4	CO4
6	Write list of operations perform on AVL tree with example? Mar 2021	3	CO4
7	a) Explain a balance factor in AVL tree with example? b) Explain representation of AVL tree with example?	2	CO4
8	a) Develop a program to insert the elements into AVL tree? b) Construction of AVL tree step by step with diagrams for the list {25, 30, 35, 40, 50, 55, 60, 65, 70, 75}. DEC 2011 DEC 2018	6	CO4
9	Illustrate Red-Black tree with example?	4	CO1,CO4
10	Illustrate Splay-tree with example? Oct 2021	4	CO1,CO4



**SRI INDU COLLEGE OF ENGG & TECH
QUESTIONBANK**

(Regulation :R20)

(Regulation :R20)

Department of Computer Science and Engineering

Sub. Code & Title	R20CSE2101 Data Structures		
Academic Year: 2022-2023	Year/Sem./Section	II-I/A,B,C,D	
Faculty Name & Designation	Dr. Kishore Verma , Mrs. A. Ramya		

UNIT IV

PART A

1 MARK QUESTIONS

		BT LEVEL	COURSE OUTCOME
1	Define a graph? DEC 2015	1	CO5,CO4
2.	Write short notes on directed graph? Mar 2021	3	CO4
3.	Write short notes on undirected graph? DEC 2016	3	CO4
4.	What the graph traversing techniques?	1	CO1,CO5
5.	Define complete graph and weighted graph? July 2021	1	CO4
6.	Describe heap sort ?	2	CO4
7.	Describe external sorting? OCT 2020	2	CO4
8	What is merge sort?	1	CO4
9	What is in-degree and out-degree of graph? July 2017	1	CO4
10	Compare BFS and DFS?	4	CO5,CO4

PART B

10 MARKS QUESTIONS

1	Write about various graph representation techniques? Dec 2017, July2021	3	CO4
2	Classify the types of graphs? Explain basic terminologies in graph?	2	CO4
3	Explain Breadth first search traversal with example? Mar 2021	2	CO5,CO4
4	Explain Depth first search traversal with example? Mar 2021	2	CO5,CO4
5	Write a program to implement breadth first search?	6	CO5,CO3
6	Write a program to implement depth first search?	6	CO5,CO4
7	Explain about heap sort with example? DEC 2015, July 2021, Mar 2021, Oct 21	2	CO3
8	Explain external sorting model for external sorting? Oct 2020	2	CO3
9	Discuss about merge sort technique with suitable example? Nov 2019	2	CO3
10	a) Distinguish between heap sort and merge sort? b) What are applications of heap sort and merge sort?	4	CO3



**SRI INDU COLLEGE OF ENGG & TECH
QUESTIONBANK**

(Regulation :R20)

(Regulation :R20)

Department of Computer Science and Engineering

Sub. Code & Title	R20CSE2101 Data Structures		
Academic Year: 2022-2023	Year/Sem./Section	II-I/A,B,C,D	
Faculty Name & Designation	Dr. Kishore Verma , Mrs. A. Ramya		

UNIT V

PART A

1 MARK QUESTIONS

		BT LEVEL	COURSE OUTCOME
1	Define Trie? Mar 2019	1	CO1,CO6
2.	What are the different types of Pattern Matching Algorithms?	1	CO6
3.	Define String and Alphabet? DEC 2015	1	CO6
4.	Describe Prefix and Suffix with example.? Oct 2020	2	CO6
5.	What is Substring? Write down the substrings of the String "DATASTRUCTURES". DEC 2017	1	CO6
6.	What is the average-case and worst-case running time of KMP algorithm?	1	CO6
7.	What is the running time of Brute-force algorithm? DEC 2016	1	CO6
8	What are the applications of pattern matching?	1	CO1,CO6
9	Write about CompressedTrie?	3	CO6
10	Write about Suffix Trie? OCT 2020	3	CO6

PART B

10 MARKS QUESTIONS

1	Discuss about various types of tries.	2	CO1
2	Write and explain Boyer Moore pattern matching algorithm? Nov 2019	6	CO6
3	Write and explain Knuth-Morris-pratt pattern matching algorithm? OCT 2020 Mar 2021 Nov 2019	6	CO1,CO6
4	What are the advantages of trie? Compare trie with Hash table?	4	CO6
5	Explain about the compressed triewith an example. Mar 2020	2	CO6
6	Calculate the failure function (or) prefix table in a search string "ABACAABADCABACABAABB". DEC 2016	6	CO6
7	Differentiate standard tries and compressed tries?	4	CO6
8	Explain the Brute-force algorithm with an example OCT 2020	2	CO1,CO6
9	Explain about the Suffix tries with an example. Nov 2018	2	CO6
10	Draw the Standard Trie and Compressed Trie for the following String {area, array, aim, acid, act, rest, rate, ratio} Dec 2018	6	CO6

PREVIOUS YEAR QUESTION PAPER

BR-18

HallTicket No.: _____

D4

Subject Code: R18CSE2101

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

Recognized under 2(f) and 12(B) of UGC Act 1956

II B.Tech – I Semester – (Regular) End Examinations - November - 2019

DATA STRUCTURES

(Common to CSE, IT)

Duration: 3 Hrs

06.11.2019

Max Marks: 70M

Section – A

Answer All the following questions

Marks: 5Qx4M =

20M

1. Evaluate the following postfix expression $632-*+1\$7+$.
2. Compare AVL tree and Red black tree.
3. Write the pseudocode to find the height of AVL tree.
4. Describe external sorting with example.
5. Write the standard trie for the set of strings $S = \{ \text{bear, bell, bid, bull, buy, sell, stock, stop} \}$.

Section – B

Answer any FIVE questions choosing at least one from each Unit

Marks: 5Qx10M =

50M

UNIT : I

6. Write a C program to implement stack using linked list representation.

(OR)

7. Write a c Program to convert given infix expression to postfix form using stack.

UNIT : II

8. Explain Searching an element in Skip list with an example and also write Pseudo code for the same.

(OR)

9. Explain with an suitable example of Extendible Hashing.

UNIT : III

10. Write a C program to construct binary search tree from the given data 4,6,8,2,5,1,7,3.

(OR)

11. Describe AVL Tree? Illustrate different rotations in AVL tree for balancing with appropriate example.

UNIT : IV

12. Construct a binary search tree from the given data 7,5,3,6,2,1,8,4,9 and perform in-order, pre-order and post-order traversal.

(OR)

13. Explain the working of merge sort with pseudocode. Sort the given elements 5,3,9,1,2,8,4,6 using merge sort technique.

UNIT : V

14. Explain working of Boyer Moore Algorithm with an suitable example.

(OR)

15. Explain Knuth-Morris-pratt pattern matching algorithm with an example.

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)(Recognized under 2(f) and 12(B) of UGC Act 1956)

II B.Tech - I Semester –End Examinations (Suppl.) October-2020**R18CSE2101 – DATA STRUCTURES**

(Common to CSE & IT)

Duration:2 Hrs**14.10.2020 (FN)****Max Marks:70M****Section – A****Answer Any Three of the following questions.****Marks: 3Qx6M =18M**

1. Write the postfix form of given infix expression $a^b+(c*d-e+(f/g+h)/i)^j/k^l$.
2. Discuss splay trees with an example.
3. List the different methods for collision resolution
4. Explain external sorting with example.
5. Mention the applications of suffix trie.

Section – B**Answer FOUR questions from the following****Marks: 4Qx13M = 52M****UNIT – I**

6. Write a C program to implement basic operation of queue using linked list representation .

(OR)

7. Write a C Program to evaluate given postfix expression using stack .

UNIT - II

8. Explain deleting an element in Skip list representation .Also write Pseudo code for the same

(OR)

9. Explain the separate chaining in detail. Use the hash function 'key mod 7', to insert the following sequence of keys in the hash table 50, 700, 76, 85, 92, 73,101.Use separate chaining technique for collision resolution.

UNIT - III

10. Explain in detail deletion of an element in BST in different cases.

(OR)

11. Illustrate red black trees with an example . Mention its advantages. Compare it with AVL trees

UNIT - IV

12. Construct a binary search tree from the given data 8,9,3,6,2,1,7,4,5 and perform in-order ,pre-order and post -order traversal .

(OR)

13. Explain the working of heap sort .Sort the given elements 5,3,9,1,2,8,4,7,6 using heap sort technique

UNIT-V

14. Explain the Brute-force pattern matching algorithm with an example..

(OR)

15. Explain Knuth-Morris-pratt pattern matching algorithm with an example.



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1956

II B.Tech I Semester (Reg./Suppl.) End Examinations March - 2021

DATA STRUCTURES

10 /03/2021

(Common to CSE and IT)

Day- 2

Duration: 3 Hrs

Marks: 5Qx14M =

70M

Answer **FIVE** questions (Treat Q.No.11 as a single question).

UNIT-I

1. Write a program in C to create two queues using linked list and identify which queue is having more number of elements and search a given element is present in both queues.

(OR)

2. Given an array arr[] of n elements, write a function to search a given element x in arr[].

Input : arr[] = {10, 20, 80, 30, 60, 50, 110, 100, 130, 170}

X=130

Output : ?

Implement the above concepts using C Program.

UNIT-II

3. Using the hash function 'key mod 7', insert the following sequence of keys in the hash table-

50, 700, 76, 85, 92, 73 and 101

Use separate chaining technique for collision resolution.

(OR)

4. Assuming the table size as the smallest prime number greater than the input size, hash the

following keys: [52, 66, 35, 04, 68, 34, 26, 19, 29]. To handle collision, use

- a) Linear probing and
b) Quadratic probing. Which of the two methods has less number of total Probes?

UNIT-III

5. Write a procedure (no code required) to delete a node from a AVL tree with suitable examples and neat figures.

(OR)

6. a) Construct a Binary Search Tree for the following order of input (step by step construction is

expected) [40, 29, 12, 34, 78, 54, 90, 57, 77, 44, 23, 11, 8, 19] [7].

- b) Traverse the above BST through Inorder, Postorder and Preorder.

UNIT-IV

7. With Example explain the following:

- a) Breadth first Traversal.
b) Depth first Traversal.

(OR)

8. Sort the following data using (MAX) heapsort: [20, 12, 35, 15, 10, 80, 30] and illustrate with appropriate figures for each iteration.

UNIT-V

9. How to build a Suffix Tree for a given text? Also explain how to search a pattern in the built suffix tree.

"AndroidOS\0".

(OR)

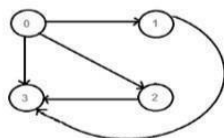
10. Explain how Knuth Morris Pratt string Search Algorithm are performed with the example String pattern.

P.T.O.

11. Answer any **THREE** questions from the following.

(5M+5M+4M)

- a) Write down the algorithm for inserting the value at the beginning of the queue?
b) What do you mean by collision resolution in hashing technique?
c) Mention how Zig-Zig and Zag-Zag rotations are performed in the splay tree.
d) Find the number of paths of length K in a directed graph for the following.



- e) Define how brute force approach is used to search the value. Specify its best and worst case time complexities.

**BR-18
D4**

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)
II B.Tech - I Semester - I Mid Term Examinations, August - 2019
(R18CSE2101) DATA STRUCTURES - (Common to CSE & IT)

**Duration: 90Mins
25M**

Dt: 26.08.2019 AN

Max Marks:

Section – A

Answer All the questions

Marks:

5Qx1M = 5M

1. Explain the advantages and disadvantages of linked list.
2. Explain the applications of Linked list.
3. Define double hashing?
4. Define collision.
5. List the operations in Binary Search Tree.

Section – B

Answer any FOUR questions

Marks:

4Qx5M = 20M

6. Discuss about implementation of single linked list.
7. Explain the following data structures operations a) Stack operations b) Queue operations.
8. Write about Queue representation using array and linked list.
9. What are the two methods of representing Liner list? Explain with example.
10. Write about Hash table and Hash function.
11. Write a procedure to perform insertion deletion and searching in Binary search tree.

**BR-18
D4**

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution Under 2(f) and 12(B) of UGC Act 1956, New Delhi)

II B.Tech - I Semester - II Mid Term Examinations
(R18CSE2101) DATA STRUCTURES - (Common to CSE & IT)

**Duration: 90Mins
25M**

Dt: 30.10.2019 AN

Max Marks:

Section – A

Answer All the questions

Marks:

5Qx1M = 5M

1. List the rules of Red-Black Tree?
2. Define complete graph and weighted graph.
3. Describe external sorting.
4. What are the different types of Pattern Matching Algorithms?
5. What are the applications of pattern matching?

Section – B

Answer any FOUR questions

Marks:

4Qx5M = 20M

6. Illustrate Red-Black tree with example?
7. Illustrate Splay-tree with example.
8. Explain Depth first search traversal with example.
9. Discuss about merge sort technique with suitable example.
10. Explain about the compressed trie with an example.
11. Explain the Brute-force algorithm with an example.
