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
Estd.2001

NAAC
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

HANDOUT

III Year CSE- Semester II

DEPARTMENT OF CSE

ACADEMIC YEAR 2022-23

DEPARTMENT OF CSE

HANDOUT- INDEX

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SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH – CSE

INSTITUTION VISION

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

INSTITUTION MISSION

IM_1 Provide high quality academic programs, training activities and research facilities.

IM_2 Promote Continuous Industry-Institute interaction for employ ability, Entrepreneurship, leadership and research aptitude among stakeholders.

IM_3 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 (PEOs)

PEO 1: **Higher Studies**: Graduates with an ability to apply knowledge of Basic Sciences and programming skills in their career and higher education.

PEO 2: **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.

PEO 3: **Professional Skills :** Graduates will be ready to work in projects related to complex problems involving multidisciplinary projects with effective analytical skills.

PEO 4: **Engineering citizenship:** Graduates with an ability to communicate well and exhibit social, technical and ethical responsibility in process or product.

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 modelling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
Program Specific Outcomes	
PSO 1	**Software Development:** To apply the knowledge of Software Engineering, Data Communication, Web Technology and Operating Systems for building IOT and Cloud Computing applications.
PSO 2	**Industrial Skills Ability:** Design, develop and test software systems for world-wide network of computers to provide solutions to real world problems.
PSO 3	**Project Implementation:** Analyze and recommend the appropriate IT infrastructure required for the implementation of a project.

COs MAPPING WITH POs & PSOs

Machine Learning (C321)

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

Course	C3201.1.	Identify the characteristics of datasets and compare the trivial data and big data for various applications(k2-Understand)
	C3201.2.	Classify machine learning techniques and computing environment that are suitable for the applications under consideration(k4-Analysis)
	C3201.3.	Solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues(k3-Apply)
	C3201.4.	Develop scaling up machine learning techniques and associated computing techniques and technologies for various applications (k6-Create)
	C3201.5.	Implement various ways of selecting suitable model parameters for different machine learning techniques(k3-Apply)
	C3201.6.	Integrate machine learning libraries, and mathematical and statistical tools with modern technologies like Hadoop distributed file system and Map Reduce programming model (k3-Apply)

Articulation Matrix

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C3201.1.	3	3	-	3	3	-	-	-	-	-	-	2	3	3	-
C3201.2.	3	2	-	3	3	-	-	-	-	-	-	-	3	2	-
C3201.3.	3	-	3	3	3	-	-	-	-	-	-	2	3	3	-
C3201.4.	3	2	3	3	3	-	-	-	-	-	-	3	3	3	-
C3201.5.	3	-	3	3	3	-	-	-	-	-	-	2	3	2	-
C3201.6.	3	-	3	3	3	-	-	-	-	-	-	-	3	3	-

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NBA & NAAC Accredited, Approved by AICTE and Permanently affiliated to JNTUH
Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

BR-20

Lr.No.SICET/AUTO/DAE/III B.Tech Academic Calendar/307/2022 **Dt: 03.08.2022**

Dr.G. SURESH,
Principal,

To,
All the HODs.

III B.TECH I SEM & II SEM ACADEMIC CALENDAR

ACADEMIC YEAR : 2022-23

Sir,

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for **B.Tech – 3rd Year** - For the academic year **2022-23** – Reg.

***

The approved Academic Calendar for **B.Tech – 3rd Year (I & II Sem)** for the academic year **2022-23** is given below:

Academic Calendar for B.Tech – 3rd Year Students (2020 - 21 Batch), BR-20 Regulation.

I - Semester

Commencement of class work	**25.08.2022 (Thursday)**	
Instruction / Class Work. (Including CRT and Dussehra Holidays).	25.08.2022	28.12.2022 – 18 Weeks
Dussehra Holidays.	03.10.2022	06.10.2022 - 4 Days
I Mid Examinations for III B.Tech I Sem Students.	27.10.2022	29.10.2022 - 3 Days
II Mid Examinations for III B.Tech I Sem Students.	29.12.2022	31.12.2022 - 3 Days
Preparation Holidays & Practical Lab Examinations.	02.01.2023	07.01.2023 - 1 Week
Remedial Mid Test (RMT).	09.01.2023	11.01.2023 - 3 Days
III B.Tech I Semester End Examination.	16.01.2023	28.01.2023 - 2 Weeks
Commencement of class work of III B.Tech II Semester - 30.01.2023 (Monday)		

II - Semester

Commencement of class work	**30.01.2023 (Monday)**	
I Spell of Instructions.	30.01.2023	20.05.2023 - 16 Weeks
I Mid Examinations for III B.Tech II Sem Students.	27.03.2023	29.03.2023 - 3 Days
II Mid Examinations for III B.Tech II Sem Students.	23.05.2023	25.05.2023 - 3 Days
Preparation Holidays & Practical Lab Examinations.	26.05.2023	31.05.2023 - 1 Week
Remedial Mid Test (RMT).	01.06.2023	03.06.2023 - 3 Days
III B.Tech II Semester End Examination.	05.06.2023	17.06.2023 - 2 Weeks

ACE **CE** **DIRECTOR** **PRINCIPAL**

Sri Indu College of Engineering & Technology
(An Autonomous Institution under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R.Dist.-501510

CONTROLLER OF EXAMINATIONS
Sri Indu College of Engineering & Technology
(An Autonomous Institution under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R.Dist.-501510

DIRECTOR
(Academic Audit)
Sri Indu College of Engineering & Technology
Sheriguda, IBP, R.R. Dist-501510.

Copy to DAE;
Copy to all the Heads of the Depts.

Machine Learning

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech. – III Year – I Semester

uL	T/P/D	C
3	-/1/-	3

(R20CSE3201) Machine Learning

Course Objectives:

The course objectives are:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT – I

Introduction - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning Concept learning and the general to specific ordering – Introduction ,A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias

UNIT - II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition Advanced topics in artificial neural networks Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms

UNIT - III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm Computational learning theory – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, The mistake bound model of learning - Instance-Based Learning- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

UNIT - IV

Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge

UNIT - V

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators, Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programmin

	SRI INDU COLLEGE OF ENGG & TECH LESSON PLAN (Regulation :R20) Department of CSE		Prepared on Rev1: Page: 5
	Sub. Code & Title	(R20CSE3201) Machine Learning	
	Academic Year: 2022-23	Year/Sem./Section	III/II
	Faculty Name & Designation	G SIRISHA ASSISTANT PROFESSSOR	

Unit/ Item No.	Topic (s)	Book Reference	Teaching Methodology	Proposed No. of Periods	Proposed Date of Handling	CO/RBT
I	INTRODUCTION OF MECHINE LEARNING			6		
1.1	Well-posed learning problems, Designing a learning system,	T-1	Black board	01		CO-1, L2
1.2	Satellite Frequency Bands Perspectives and issues in machine learning Concept learning and the general to specific ordering	T-1,R-1	PPT	01		CO-1,L2
1.3	Satellite Systems Introduction, A concept learning task,	T-1,R-2	PPT	01		CO-1,L2
1.4	Concept learning as search	R-2	Black board	01		CO-1,L1
1.5	Orbital Period and Velocity Find-S: finding a maximally specific hypothesis	T-1	Black board	01		CO-1,L2
1.6	Effects of orbital inclination Version spaces and the candidate elimination algorithm	T-1,	Black board	01		CO-1,L2
	Review	Signature of the HOD/Coordinator				

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	Academic Year: 2022-23	Year/Sem./Section	III/II
	Faculty Name & Designation	G SIRISHA ASSISTANT PROFESSSOR	

Unit/ Item No.	Topic (s)	Book Reference	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
	UNIT –II					
II	**Decision Tree learning**			**11**		
2.1	Decision Tree learning - Introduction, Decision tree representation,	T-1,R-1	Black board	01		CO-2,L3
2.2	Appropriate problems for decision tree learning, The basic decision tree learning algorithm,	T-1, ,R-1	PPT	02		CO-2,L3
2.3	Hypothesis space search in decision tree learning,	T-1, R-1	Black board	01		CO-2,L3
2.4	Inductive bias in decision tree learning	T-1,R-1	Black board	01		CO-2,L3
2.5	Issues in decision tree learning Artificial Neural Networks - Introduction, Neural network representation,	T-1,R-1	PPT	01		CO-2,L3
2.6	Appropriate problems for neural network learning, Perceptions,	T-1,R-1	Black board	01		CO-2,L3
2.7	Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm,	T-1	Black board	01		CO-2,L3
2.8	illustrative example face recognition Advanced topics in artificial neural networks Evaluation Hypotheses - Motivation,	T-1	Black board	01		CO-3,L3
2.9	Estimation hypothesis accuracy, Basics of sampling theory,	T-1	Black board	01		CO-3,L3
2.10	A general approach for deriving confidence intervals,	T-1,R-1	Black board	01		CO-3,L3
2.11	Difference in error of two hypotheses, Comparing learning algorithms	T-1	PPT	01		CO-3,L3
	Review	**Signature of the HOD/Coordinator**				

	SRI INDU COLLEGE OF ENGG & TECH LESSON PLAN (Regulation :R20) Department of CSE	Prepared on Rev1: Page: 5
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	Academic Year: 2022-23 / Year/Sem./Section: III/II	
	Faculty Name & Designation: G SIRISHA ASSISTANT PROFESSSOR	

UNIT- III						
III	**Bayesian learning – Introduction**			**13**		
3.1	Bayes theorem, Bayes theorem and concept learning,	R-1	Black board	01		CO-4,L4
3.2	Maximum likelihood and least squared error hypotheses	T-1	Black board	01		CO-4,L4
3.3	Maximum likelihood hypotheses for predicting probabilities	T-1	Black board	01		CO-4,L4
3.4	Minimum description length principle	T-1,R-1	Black board	01		CO-4,L4
3.5	Rain induced attenuation Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks	T-1,R-1	Black board	01		CO-4,L4
3.6	The EM algorithm Computational learning theory - Introduction	T-1	Black board	01		CO-4,L4
3.7	Multiple Access: Frequency Division Multiple Access (FDMA)Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space,	T-1,R-2,R-3	PPT	01		CO-4,L4
3.8	Sample Complexity for infinite Hypothesis Spaces	T-1,R-1,R-2	PPT	01		CO-4,L4
3.9	The mistake bound model of learning - Instance-Based Learning- Introduction,	T-1	Black board	01		CO-4,L4
3.10	, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions,	T-1	Black board	01		CO-4,L4
3.11	CharacteristicsCase-Based Reasoning, Remarks on Lazy and Eager Learning Genetic Algorithms	T-1	Black board	01		CO-4,L4
3.12	Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming,	T-1	PPT	01		CO-4,L4
3.13	, Models of Evolution and Learning, Parallelizing Genetic Algorithms	T-1	PPT	01		CO-4,L4
	Review	**Signature of the HOD/Coordinator**				

	SRI INDU COLLEGE OF ENGG & TECH LESSON PLAN (Regulation :R20) Department of CSE		Prepared on Rev1: Page: 5
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	Faculty Name & Designation	G SIRISHA ASSISTANT PROFESSSOR	

UNIT-IV						
IV	Learning Sets of Rules					
4.1	TransmittersIntroduction, Sequential Covering Algorithms	T-2,R-1	PPT	01		CO-5,L2
4.2	ReceiversLearning Rule Sets: Summary, Learning First Order Rules,	T-2,R-1	PPT	01		CO-5,L2
4.3	Antennas, Learning Sets of First Order Rules: FOIL	T-2,T-3,R-2	Black board	01		CO-5,L2
4.4	Tracking SystemsInduction as Inverted Deduction, Inverting Resolution Analytical Learning – Introduction	T-2,R-2	Black board	01		CO-5,L2
4.5	Terrestrial InterfaceLearning with Perfect Domain Theories:	T-2	Black board	01		CO-5,L2
4.6	Prolog-EBG Remarks on Explanation-Based Learning,	T-2	Black board	01		CO-5,L2
4.7	Explanation-Based Learning of Search Control Knowledge	T-1	Black board	01		CO-5,L2
	Review	**Signature of the HOD/Coordinator**				

	SRI INDU COLLEGE OF ENGG & TECH LESSON PLAN (Regulation :R20) Department of CSE		Prepared on Rev1: Page: 5
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	Academic Year: 2022-23	Year/Sem./Section	III/II
	Faculty Name & Designation	G SIRISHA ASSISTANT PROFESSSOR	

UNIT-V						
V	Combining Inductive and Analytical Learning –			10		
Unit/ Item No.	Topic (s)	Book Reference	Teaching Methodology	Proposed No. of Periods	Proposed Date of Handling	CO/RBT
5.1	Message Transmission by FDMA: M/G/1 QueueMotivation, Inductive-Analytical Approaches to Learning,	T-3	PPT	02		CO-6,L5
5.2	Using Prior Knowledge to Initialize the Hypothesis,	T-3	Black board	02		CO-6,L5
5.3	Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators,	T-3	Black board	02		CO-6,L5
5.4	Slotted AlohaReinforcement Learning - Introduction, The Learning Task, Q Learning	T-3	PPT	02		CO-6,L5
5.5	, Non-Deterministic, Rewards and Actions, Temporal Difference Learning, Generalizing from Examples	T-3	Black board	01		CO-6,L5
5.6	Tree AlgorithmRelationship to Dynamic Programming	T-3	Black board	01		CO-6,L5
	Review	Signature of the HOD/Coordinator				

LIST OF TEXT BOOKS AND

REFERENCES

TEXT BOOKS:

T1. Machine Learning – Tom M. Mitchell, - MGH
T2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)

REFERENCE BOOKS:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.

WebReferences:

1. Httd://ww.udemy.com/MachineLearning/Online_Course
2. https://en.wikipedia.org/wiki/Machine_learning

Course Outcomes:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses.
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

CONTENT BEYOND THE SYLLABUS

S.No	Topics	Proposed Actions	Date	Resource Person/Mode	Pos	PSOs
1	Introduction - Well-posed learning problems	Class room(1 Period)	23-3-21	G.SIRISHA	PO5,PO10,PO6	PSO1,PSO2
2	Decision Tree learning - Introduction	Class room(1 Period)	3-4-21	G.SIRISHA	PO5,PO10,PO6	PSO1,PSO2
3	Machine learning based Artificial Neural networks	Online	27-04-21	NPTEL	PO5,PO10,PO6	PSO1,PSO2
4	Tools and Resources Cognitive Science influences	Online	10-5-21	NPTEL	PO5,PO10,PO6	PSO1,PSO2

	SRI INDU COLLEGE OF ENGG & TECH LESSON PLAN (Regulation :R20) Department of Information Technology		Prepared on Rev1: Page: 5
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	Academic Year: 2022-23	Year/Sem./Section	III/I
	Faculty Name & Designation	G SIRISHA ASSISTANT PROFESSSOR	

ASSIGNMENT

S.No.	Assignment Questions	Course Outcome	Books To be Referred	Date Of Announcement	Date Of Submission
1	Explain a concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis	CO-1	T-1		
2	Illustrate Neural network representation, Appropriate problems for neural network learning, Perceptions	CO-1	T-1		
3	Explain Multi layer networks and the back propagation algorithm,	CO-2	R-1		
4```	Describe A general approach for deriving confidence intervals	CO-3	T-1		
5	Explain Bayes theorem and concept learning	CO-3	T-2		
6	Explain Instance-Based Learning	CO-4	T-1		
7	IllustrateCombining Inductive and Analytical Learning	CO-5	T-1		
8	Explain Prior Knowledge to Initialize the Hypothesis	C0-5	T-1		
9	IllustrateReinforcement Learning	CO-6	T-1		
10	Explain Inverting Resolution Analytical Learning	CO-6	T-1		

SELF STUDY TOPICS

S.No.	Topics	Books & Journals	Course Outcomes
1	Machine Learning Methods	Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.	CO-1
2	Bayesian learning	Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001	CO-6
3	Neural Networks	.Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.	CO-4

QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)

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

UNIT-1 Machine Learning

	1 MARKS QUESTIONS	BT Level	Course Outcome
1.	Define Machine Learning.?	1	CO1
2.	Discuss applications of ML?	6	CO1
3.	What is well- posed learning problems.?	1	CO1
4..	Explain the steps in designing a learning systems in detail.?	2	CO1
5.	Explain different perspective and issues in machine learning.?	2	CO1
6.	Define concept learning task?	1	CO1
7.	Explain the General-to-Specific Ordering of Hypotheses?``	2	CO1
8	Define Consistent Hypothesis ?	1	CO1
9	DefineVersion Space.?	1	CO1
10	Write LIST-THEN-ELIMINATE algorithm.	2	CO1
	10 MARKS QUESTIONS		
1.	Define Machine Learning. Explain with examples why machine learning isimportant	1	CO1
2.	.Describe the following problems with respect to Tasks, Performance and Experience: a.A Checkers learning problem b.A Handwritten recognition learning problem c.A Robot driving learning problem	2	CO1
3.	Write FIND-S algorithm and explain with example given below	2	CO1
4.	Write the final version space for the below mentioned training examples using candidate elimination algorithm.	2	CO1

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	Ent
1	Sunny	Warm	Normal	Strong	Warm	Same	Ye
2	Sunny	Warm	High	Strong	Warm	Same	Ye
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Ye

Size	Color	Shape	Class

Origin	Manufacturer	Color	Decade	Type	Example Typ
Japan	Honda	Blue	1980	Economy	Positive
Japan	Toyota	Green	1970	Sports	Negative
Japan	Toyota	Blue	1990	Economy	Positive
USA	Chrysler	Red	1980	Economy	Negative
Japan	Honda	White	1980	Economy	Positive
Japan	Toyota	Green	1980	Economy	Positive
Japan	Honda	Red	1990	Economy	Negative

Big	Red	Circle	No
Small	Red	Triangle	No
Small	Red	Circle	Yes
Big	Blue	Circle	No
Small	Blue	Circle	Yes

5.	Explain in detail the Inductive Bias of Candidate Elimination algorithm.	2	CO1
6.	Define Consistent Hypothesis and Version Space.	1	CO1
7.	Define concept learning and discuss with example.	1	CO1
8	Explain the steps in designing a learning systems indetail.	2	CO1
9	What is well- posed learningproblems.explain with example.	1	CO1
10	Define Machine Learning. Explain with examples why machine learning is important.	1	CO1

Unit -II : DECISION TREE LEARNING			
1 MARKS QUESTIONS			
1.	What is decision tree and decision tree learning?	1	CO2
2.	What are appropriate problems for Decision tree learning?	1	CO2
3.	Give Decision trees to represent the Boolean Functions: a) A && ~ B b) A V [B && C] c) A XOR B d) [A&&B] V [C&&D]	6	CO2
4.	What are issues in learning decision trees	1	CO2
5.	Write a note on Occam's razor and minimum description principal.	6	CO2
6.	What is Artificial Neural Network?	1	CO2
7.	Design a two-input perceptron that implements the boolean function A Λ ¬ B. Design a two-layer network of perceptron's that implements A XOR B.	6	CO2

8	Derive the Gradient Descent Rule		CO2
9	Write Gradient Descent algorithm for training a linear unit.	6	CO2

10	Derive the Back Propagation Rule	2	CO2
	10 MARKS QUESTIONS		
1	Explain the followings w.r.t Back Propagation algorithm • Convergence and Local Minima • Representational Power of Feedforward Networks • Hypothesis Space Search and Inductive Bias • Hidden Layer Representations • Generalization, Overfitting, and Stopping Criterion	2	CO2
2.	Consider two perceptrons defined by the threshold expression w0 + wlxl+ w2x2 > 0. Perceptron A has weight values w0 = 1, w1=2, w2=1 and perceptron B has the weight values w0 = 0, w1=2, w2=1 True or false? Perceptron A is more-general than perceptron B.	2	CO2
3.	Write a note on (i) Perceptron Training Rule (ii) Gradient Descent and Delta Rule	6	CO2
4.	How a single perceptron can be used to represent the Boolean functions such as AND,OR	1	CO2
5.	Design a two-input perceptron that implements the boolean function A Λ ¬ B. Design atwo-layer network of perceptron's that implements A XOR B.	6	CO2
6.	Give Decision trees for the following set of training examples	6	CO2

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

7.	Consider the following set of training examples. a) What is the entropy of this collection of training example with respect to the target function classification?	3	CO2

b) What is the information gain of a2 relative to these training examples?

Instance	Classification	a_1	a_2
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

8 Identify the entropy, information gain and draw the decision trees for the following set of training examples — CO3

Gender	Car ownership	Travel cost	Income Level	Transportation (Class)
Male	0	Cheap	Low	Bus
Male	1	Cheap	Medium	Bus
Female	1	Cheap	Medium	Train
Female	0	Cheap	Low	Bus
Male	1	Cheap	Medium	Bus
Male	0	Standard	Medium	Train
Female	1	Standard	Medium	Train
Female	1	Expensive	High	Car
Male	2	Expensive	Medium	Car
Female	2	Expensive	High	Car

9	What are Restriction Biases and Preference Biases and differentiate between them.	1	CO3
10	Discuss Inductive Bias in Decision Tree Learning.	2	CO3

Unit – III : BAYESIAN LEARNING

1 MARKS QUESTIONS

1.	Define Bayesian theorem?	1	CO3
2.	Explain the practical difficulties of Bayesian theorem.	2	CO3
3	What are Consistent Learners?	1	CO3
4.	Explain Brute force Bayes Concept Learning	2	CO3
5	Describe the concept of MDL.	2	CO3
6.	Explain the concept of EM Algorithm	2	CO4
7	Explain Binomial Distribution with an example.	2	CO4
8.	What are instance based learning?	1	CO4
9.	Define the following terms with respect to K - Nearest Neighbour Learning	1	CO4
10.	Explain radial basis function	2	CO4

10 MARK QUESTIONS

1.	Explain the Q function and Q Learning Algorithm assuming	1	CO3

	deterministic rewards and actions with example.		
2	What is Reinforcement Learning and explain Reinforcement learning problem with neat diagram.	1	CO3
3.	Explain CADET System using Case based reasoning.	2	CO3
4	Define the following terms with respect to K - Nearest Neighbour Learning : i) Regression ii) Residual iii) Kernel Function.	1	CO3
5.	Suppose hypothesis h commits r = 10 errors over a sample of n = 65 independently drawn examples. •What is the variance and standard deviation for number of true error rate errorD(h)? •What is the 90% confidence interval (two-sided) for the true error rate? •What is the 95% one-sided interval (i.e., what is the upper bound U such that errorD(h) ≤5 U with 95% confidence)? •What is the 90% one-sided interval?	1	CO4
6	Explain the concept of EM Algorithm. Discuss what are Gaussian Mixtures	2	CO4
7.	Describe the concept of MDL. Obtain the equation for hMDL	2	CO4
8.	Consider a medical diagnosis problem in which there are two alternative hypotheses: 1.that the patient has a particular form of cancer (+) and 2. That the patient does not (-). A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only 97% of the cases in which the disease is not present. Furthermore, .008 of the entire population have this cancer. Determine whether the patient has Cancer or not using MAP hypothesis.	6	CO4

α	0.100	0.050	0.025	0.001
$1-\alpha$	0.900	0.950	0.975	0.999
$z_{1-\alpha}$	1.28	1.64	1.96	3.09

9.	Define is Maximum a Posteriori (MAP) Maximum Likelihood (ML) Hypothesis. Derive the relation for h_{MAP} and h_{ML} using Bayesian theorem.	1	CO4
10.	Define Bayesian theorem? What is the relevance and features of Bayesian theorem? Explain the practical difficulties of Bayesian theorem.	1	CO4

Unit-IV: Learning Sets of Rules			
1 MARKS QUESTIONS			
1.	What are the Learning Sets of Rules?	3	CO5
2.	Explain about Sequential covering algorithm?	2	CO5
3.	Describe Learn-One-Rule?	1	CO5
4.	Write Learning First-Order Rules?	3	CO5
5.	What are the Specializing Rules in FOIL?	3	CO5
6.	Defined inverted Induction?	1	CO5
7.	Defined inverted Ddeduction?	1	CO5
8	Explain Learning First-Order Rules?	2	CO5
9	Defined PROGOL	1	CO5
10	Defined CIGOL?	1	CO5
10 MARK QUESTIONS			
1.	Discus about PROGOL ?	1	CO5
2.	Describe in details of Inverting Resolution?	1	CO5
3.	Explain details of Learning Sets of Rules?	2	CO5
4.	Write the Sequential Covering Algorithm? With examample.	3	CO5
5.	Describe First Order Rule for Classifying Web Pages.	1	CO5
6.	Discus about PROGOL ?	1	CO5
7.	Defend Induction as Inverted Deduction .	5	CO5
8	What are the Deduction Resolution Rule.	3	CO5
9	Classify the First order resolution.	2	CO5

10	Write the Sequential Covering Algorithm .Demonstrate the whether forcasting example.?	3	CO5

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
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D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

V-Combining Inductive and Analytical Learning			
1 MARKS QUESTIONS			
1.	Defind Combining Inductive and Analytical Learning?	1	CO6
2.	Defferentiate the Inductive and Analytical Learning?	4	CO6
3.	Defind Domain Theory?	1	CO6
4.	Describe KBANN?	2	CO6
5.	Defind Hypothesis Space.	1	CO6
6.	Describe EBNN.	2	CO6
7.	Demonstrate TangetProp.	3	CO6
8	Describe FOCL.	1	CO6
9	Discus Reinforcement Learning	1	CO6
10	Describe the Using Prior Knowledge to Augment Search Operators	1	CO6
10 MARK QUESTIONS			
1.	Discuss the FOCL Algorithm in detail.	2	CO6
2.	Memorize the Domain Theory.give a traning example.	1	CO6
3.	Discuss Combining Inductive and Analytical Learning in detail. explain motivation.	2	CO6
4	Implement the Neural Net Equivalent to Domain Theory	3	CO6
5.	Explain Motivation Inductive-Analytical Approaches to Learning	2	CO6
6.	Discuss the EBNN Algorithm	2	CO6
7.	Discuss the TangentProp Algorithm. n Illustrative Example	2	CO6
8	Explain KBANN Algorithm.Give an Example	2	CO6
9	Discuss about Hypothesis Space Search.Demonstrate the Using Prior Knowledge to Initialise the Hypothesis	2	CO6
10	What is nthe Motivation.Explain Motivation Inductive-Analytical Approaches to Learning	3	CO6

Code: R18CSE3201

Sri Indu College of Engineering & Technology

(An Autonomous Institution under JNTUH)

Sheriguda (V), Ibrahimpatnam, R.R.Dist.

Machine Learning

(Model Question Paper)

Branch: B.Tech. (IT). Max. Marks: 70

Branch: III Year/ II Sem.

Max Marks: 70

I. Answer all the Questions each carry 4 marks 5*4=20

1. Explain the steps in designing a learning systems in detail.?
2. Give Decision trees to represent the Boolean Functions:
   a) A && ~ B
   b) A V [B && C]
   c) A XOR B
   d) [A&&B] V [C&&D]
3. Explain the practical difficulties of Bayesian theorem.
4. Explain about Sequential covering algorithm?
5. Define Domain Theory?

II. Answer any 5 questions,each carry 10 marks 5*10=59

UNIT -I

6. Describe the following problems with respect to Tasks,Performance and Experience:
   a.A Checkers learning problem
   b.A Handwritten recognition learning problem
   C .A Robot driving learning problem **(10)**

(OR)

7. Write the final version space for the below mentioned training examples using candidate elimination algorithm **(10)**

Size	Color	Shape	Class
Big	Red	Circle	No
Small	Red	Triangle	No
Small	Red	Circle	Yes
Big	Blue	Circle	No
Small	Blue	Circle	Yes

UNIT-II

8. Explain the followings w.r.t Back Propagation algorithm **(10)**

   - Convergence and Local Minima

- Representational Power of Feed forward Networks
- Hypothesis Space Search and Inductive Bias
- Hidden Layer Representations
- Generalization, Over fitting, and Stopping Criterion

(OR)

9. Give Decision trees for the following set of training examples **(10)**

Day	Outlook	Temperature	Humidity	Wind	Play Tennis
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	Yes
5	Rain	Cool	Normal	Weak	Yes
6	Rain	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rain	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rain	Mild	High	Strong	No

UNTI –III

10 Suppose hypothesis h commits r = 10 errors over a sample of n = 65 independently drawn examples.

- What is the variance and standard deviation for number of true error rate errorD(h)?
- What is the 90% confidence interval (two-sided) for the true error rate?
- What is the 95% one-sided interval (i.e., what is the upper bound U such that errorD(h) ≤5 U with 95% confidence)?
- What is the 90% one-sided interval? (10)

α	0.100	0.050	0.025	0.001
$1-\alpha$	0.900	0.950	0.975	0.999
$z_{1-\alpha}$	1.28	1.64	1.96	3.09

(OR)

11 Define is Maximum a Posteriori (MAP) Maximum Likelihood (ML) Hypothesis. Derive the relation for hMAP and hML using Bayesian theorem. (10)

UNIT-IV

12 Write the Sequential Covering Algorithm? With example. (10)

(OR)

13 Discus about PROGOL ? (10)

UNIT-V

14 Discuss about Hypothesis Space Search.Demonstrate the Using Prior Knowledge to Initialize the Hypothesis. (10)

(OR)

15.What is the Motivation.Explain Motivation Inductive-Analytical Approaches to Learning (10)

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UGC Autonomous Institution
Recognized under 2(f) & 12(B) of UGC Act 1956,
NAAC, Approved by AICTE &
Permanently Affiliated to JNTUH
Estd.2001

NAAC
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

HANDOUT

III--CSE- Semester II

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2022-23

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

HANDOUT- INDEX

S. No	Contents
1	Vision, Mission, PEOs, POs, PSOs & 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

B. TECH COMPUTER SCIENCE AND ENGINEERING

INSTITUTION VISION

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

INSTITUTION MISSION

IM_1: Provide high quality academic programmes, training activities and research facilities.

IM_2: Promote continuous industry-institute interaction for employability, entrepreneurship, leadership and research aptitude among stakeholders.

IM_3: Contribute to the economic and technological development of the region, state and nation.

DEPARTMENT VISION

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

DEPARTMENT MISSION

DM_1: To offer quality education in computing.

DM_2: To provide an environment that enables overall development of all the stakeholders.

DM_3: To impart training on emerging technologies like Data Analytics, Atificial Intelligence and Internet Of Things.

DM_4: To encourage participation of stakeholders in research and development.

Program Educational Objectives(PEO's)

PEO 1: Graduates with strong foundation in mathematical and core concepts, which enable them to participate in research, in the field of Computer Science.

PEO 2: Graduates with application development, problem solving skills by learning the computer programming methods of the industry and related domains.

PEO 3: Graduates with multidisciplinary knowledge by understanding the scope of association of computer science engineering along with other engineering disciplines.

PEO 4: Graduates with communication skills, soft skills, organizing skills which build the professional qualities, understand the social responsibilities and ethical attitude.

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

PO	Description
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

Program Specific Outcomes	
PSO1	The ability to develop software projects using standard practices and suitable programming environment.
PSO2	To apply computer science knowledge in exploring and adopting latest technologies in different co-curricular activities.

COURSE OUTCOMES (CO's)

COURSE NAME: Compiler Design(CSE3202)
At the end of the course, the student will be able to

Course Outcomes (COs)	
C322.1	Describe the Phases of compilation and concept of data structures in compiler and Top Down parsing.(Understand)
C322.2	Constructing the Bottom up parsing with problems based on LR and LALR ,Dicuss about Error recovery in parsing. (Apply)
C322.3	Constructing the Semantic Analysis into Intermediate code and Creating the Symbol Table Format.(Create)
C322.4	Describing about the storage allocation of static and dynamic, arrays.(Remember)
C322.5	Describing the code optimization and designing the data flow analysis.(Create)
C322.6	Analyze & Design the concept of Code Generation algorithms and DAG.(Create)

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

CO	PO											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
C322.1	3	2	3	3	1	-	-	-	-	-	-	1
C322.2	3	3	3	3	-	-	-	-	-	-	-	1
C322.3	3	3	3	3	-	-	-	-	-	-	-	1
C322.4	3	2	3	\-	-	-	-	-	-	-	-	1
C322.5	3	3	3	3	-	-	-	-	-	-	-	2
C322.6	3	3	3	3	-	-	-	-	-	-	-	1
C322	**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
C322.1	3	3
C322.2	3	3
C322.3	3	3
C322.4	3	3
C322.5	3	3
C322.6	3	3
	3	3

CO-PO/PSO MAPPING

C322.1	Describe the Phases of compilation and concept of data structures in compiler and Top Down parsing.(Understand).

Mapped POs:PO1,PO2,PO3,PO4,PO5,PO12

PO1	The basic knowledge of Compiler can be applied to solve Top Down parsing problems.
PO2	Analyses the problems related to compiler Concepts
PO3	The knowledge of Compiler Concepts can be applied to design solutions to complex engineering problems.
PO4	The knowledge of Parser Concepts can be used for research based knowledge and research based methods.
PO5	Apply appropriate Techniques and compiler Tools(LEX TOOL).
PO12	Compilers are need for Recognize Life long Learning.

C322.2	Constructing the Bottom up parsing with problems based on LR and LALR ,Dicuss about Error recovery in parsing. (Apply)

Mapped POs:PO1,PO2,PO3,PO4,PO12

PO1	The knowledge of Bottom up parsing, LA and LALR classes can be applied to solve complex engineering problems.
PO2	Analyses the problems related to Bottom up parsing.
PO3	The knowledge of Grammar can be applied to design solutions to complex engineering problems.
PO4	The knowledge of Parser Concepts can be used for research based knowledge and research based methods.
P12	Compilers are need for Recognize Life long Learning.

C322.3	Constructing the Semantic Analysis into Intermediate code and Creating the Symbol Table Format.(Create)

Mapped POs:PO1,PO2,PO3,PO4,PO12

PO1	This basic knowledge of Conversion of popular programming languages and different type checkers.
PO2	Analysis the syntax tree and attributed Grammar.
PO3	This basic knowledge of symbol table formats can be used in designing solutions to complex engineering problems.
PO4	The Knowledge of constructing the semantic analysis into intermediate code for research based methods.

PO12	Compilers are need for Recognize Life long Learning.

C322.4	Describing about the storage allocation of static and dynamic, arrays.(Remember)

Mapped POs:PO1, PO2, PO3,PO12

PO1	The knowledge of Storage allocation can be applied to solve static and dynamic and their complex problems.
PO2	Analyses problems related to arrays.
PO3	This knowledge can be used heap storage.
PO12	Compilers are need for Recognize Life long Learning.

C322.5	Describing the code optimization and designing the data flow analysis.(Create)

Mapped POs: PO1, PO2, PO3,PO4,PO12

PO1	The knowledge of Code Optimization to solve complex engineering problems.
PO2	Analyses Data Flow analysis Representation.
PO3	This knowledge can be used to design of Flow Graph.
PO4	This knowledge is used to interpretation of data and synthesis of information to valid conclusions.
PO12	Interpreters are need to recognize the Life time Learning

C322.6	Analyze & Design the concept of Code Generation algorithms and DAG.(Create)

Mapped POs: PO1, PO2, PO3,PO4,PO12

PO1	The knowledge of code generation to solve complex engineering problems.
PO2	Analyses DAG Representation.
PO3	This knowledge can be used to assignment generic code generation algorithms to complex problems.
PO4	This knowledge is used to generate code and code optimize.
PO12	Code Generators are need to recognize the Life time Learning

Academic calender-2021-22

SAI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)
Recognized under 2(f) and 12(B) of UGC Act 1956
NBA & NAAC Accredited. Approved by AICTE and Permanently affiliated to JNTUH
Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

D4

BR-18

Lr.No.SICET/AUTO/DAE/Academic Calendar/406/2021 **Dt: 28.08.2021**

Dr.G. SURESH,
Principal,

To,
All the HODs.

ACADEMIC CALENDAR : 2021-22

Sir,

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for **B.Tech – 3rd & 4th Year** - For the academic year **2021-22** – Reg.

***

The approved Academic Calendar for **B.Tech – 3rd & 4th Year (I & II Sem)** for the academic year **2021-22** is given below:

- **B.Tech 3rd Year for (2019 - 20 Batch) BR - 18 Regulation**
- **B.Tech 4th Year for (2018 - 19 Batch) BR - 18 Regulation**

Academic Calendar for B.Tech – 3rd & 4th Year Students

I - Semester

Commencement of class work	**06.09.2021 (Monday)**	
I Spell of Instructions (Including CRT & Dasara Holidays).	06.09.2021	06.11.2021 – 9 Weeks
I Mid Examinations for III & IV Year Students.	08.11.2021	13.11.2021 - 1Week
II Spell of Instructions.	15.11.2021	08.01.2022 - 8 Weeks
II Mid Examinations for III & IV Year Students.	10.01.2022	18.01.2022 - 1 Week
Preparation Holidays & Practical Examinations.	19.01.2022	25.01.2022 - 1 Week
III & IV Semester End Examinations (Regular).	27.01.2022	09.02.2022 - 2 Weeks
Supplementary Examinations and Placements	10.02.2022	23.02.2022 - 2 Weeks
Commencement of class work of 3rd & 4th Year II Semester – 10.02.2022 (Thursday)		

II - Semester

Commencement of class work	**10.02.2022 (Thursday)**	
I Spell of Instructions.	10.02.2022	06.04.2022 - 8 Weeks
I Mid Examinations for III & IV Year Students.	07.04.2022	13.04.2022 - 1 Week
II Spell of Instructions (Including Summer Vacation).	16.04.2022	24.06.2022 - 10 Weeks
II Mid Examinations for III & IV Year Students.	25.06.2022	01.07.2022 - 1 Week
Preparation Holidays & Practical Examinations, Project Evaluation (IV B.Tech).	02.07.2022	09.07.2022 - 1 Week
End Semester Examinations for (III & IV B.Tech).	11.07.2022	23.07.2022 - 2 Weeks
Supplementary Examinations and Placements	25.07.2022	06.08.2022 - 2 Weeks
Commencement of class work for the A.Y. (2022-23) - 10.08.2022 (Wednesday)		

ACE CE DEAN PRINCIPAL

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DEPARTMENT CALENDAR – 2020-2021 (SECOND SEMESTER)

DAYS	MARCH '22	APRIL '22	MAY '22	JUNE '22	JULY '22	AUGUST '22
SUNDAY						
MONDAY	1					
TUESDAY	2			1 MID I EXAM		
WEDNESDAY	3			2 MID I EXAM		
THURSDAY	4	1		3 MID I EXAM	1	
FRIDAY	5	2 UGADI		4 MID I EXAM	2	
SATURDAY	6	3	1 MAY DAY	5 MID I EXAM	3 Project Expo (II, III, IV)	
SUNDAY	7 HOLIDAY	4 HOLIDAY	2 HOLIDAY	6 HOLIDAY	4 HOLIDAY	1 HOLIDAY
MONDAY	8 Maharishi Dayanand Saraswati Jayanti	5 BABU JAGJEEVAN RAM JYANTHI	3	7	5	2 MID II EXAM
TUESDAY	9	6	4	8	6	3 MID II EXAM
WEDNESDAY	10	7	5	9 SUBMISSION OF MID I MARKS	7	4 MID II EXAM
THURSDAY	11 Maha Shivaratri/Shivaratri	8	6	10	8	5 MID II EXAM
FRIDAY	12	9	7 Project Review	11	9	6 MID II EXAM
SATURDAY	13	10 Career Awareness (III Yr)	8 Project Review	12 Seminar (II Yr)	10 Design Contest (III Yr)	7 MID II EXAM
SUNDAY	14 HOLIDAY	11 HOLIDAY	9 HOLIDAY	13 HOLIDAY	11 HOLIDAY	8 HOLIDAY
MONDAY	15	12	10	14	12	9 Practical Exam (II, III) Project Evaluation (IV)
TUESDAY	16	13 UGADI	11	15	13	10 Practical Exam (II, III) Project Evaluation (IV)
WEDNESDAY	17	14 DR AMBEDKAR JYANTHI	12	16	14	11 SUBMISSION OF MID II MARKS Practical Exam (II, III) Project Evaluation (IV)
THURSDAY	18	15	13	17	15	12 Practical Exam (II, III) Project Evaluation (IV)
FRIDAY	19	16	14 ID- UL FITR	18	16	13 Practical Exam (II, III) Project Evaluation (IV)
SATURDAY	20	17 Technical Seminar (IV Yr)	15 Technical Talk (III Yr)	19 Webinar (III Yr)	17 Workshop (IV Yr)	14 Practical Exam (II, III) Project Evaluation (IV)
SUNDAY	21 HOLIDAY	18 HOLIDAY	16 HOLIDAY	20 HOLIDAY	18 HOLIDAY	15 HOLIDAY
MONDAY	22 Commencement of Classes II,III,IV	19	17	21	19	16 COMMENCEMENT OF END SEMESTER EXAM (II,III, IV Year)
TUESDAY	23	20	18	22	20	17
WEDNESDAY	24	21 RAMA NAVAMI	19	23	21 BAKRID	18
THURSDAY	25	22	20	24	22	19 MUHARRAM
FRIDAY	26	23	21	25 Project Review	23	20 END SEMESTER EXAM
SATURDAY	27 Guest Lecture (II Yr)	24 Quiz Contest (II Yr)	22 Poster Presentation (II, III Yr)	26 Project Review	24 Workshop (II Yr)	21
SUNDAY	28 HOLIDAY	25 HOLIDAY	23 HOLIDAY	27 HOLIDAY	25 HOLIDAY	22 HOLIDAY
MONDAY	29 Holi	26	24	28	26	23
TUESDAY	30	27	25	29	27	24
WEDNESDAY	31	28	26	30	28 Project Review	25 END SEMESTER EXAM (II,III, IV Year)
THURSDAY		29	27		29 Project Review	26
FRIDAY		30	28		30	27
SATURDAY			29 Workshop (IV Yr)		31	28
SUNDAY			30 HOLIDAY			29 HOLIDAY
MONDAY			31 MID I EXAM			30 JANMASHTAMI

Sri Indu College of Engineering &Technology

(An Autonomous Institution under UGC)
Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy (Dist) – 501 510

Department of Computer Science & Engineering

ROOM NO: 202
Class: III CSE-A (II SEM) **Time - Table**

w.e.f: 3-03-2022

Time	9:40 – 10:40	10:40 – 11:40	11:40 – 12:40	12:40 To 1:20	1:20 – 2:15	2:15 – 3:10	3:10 – 4:00
Days	1	2	3		4	5	6
Monday	STM	ITE	CD	LUNCH	ML LAB		
Tuesday	CD LAB				ML	STM	DAA
Wednesday	STM LAB				**CD**	**ITE**	**ML**
Thursday	CD	ML	DAA		STM	**CS**	ITE
Friday	DAA	STM	CD		ML	ITE	CS
Saturday	ML	DAA	CD		ITE	STM	**DAA**

SUBJECT CODE	SUBJECT NAME	FACULTY NAME
ML	Machine Learning	Mrs.P.Sneha
CD	Compiler Design	Mrs.V.Kiranmai
DAA	Design and Analysis of Algorithms	Dr.Vijayarangan
STM	Software Testing Methodologies	Mrs.K.Sandhya
ITE	Information Technology Essentials	Mrs.E.Pavithra
ML LAB	Machine Learning Lab	Mrs. Sharadha/ Mrs. K. V*ijayalakshmi* / Dr.k.Gunasekaran
CD LAB	Compiler Design Lab	Mrs.V.Kiranmai /Mr.K.Mahesh Kumar / Mr.K.Naveenchakravarthy
STM LAB	Software Testing Methodologies Lab	Mrs.K. Sandhya /Mrs.K.Archana/ Mr.K.Nagu
CS	Cyber Security	Mr. SNVASRK Prasad

Class Co-Ordinator **HOD**

Mrs.K.Sandhya

Sri Indu College of Engineering &Technology

(An Autonomous Institution under UGC)
Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy (Dist) – 501 510

Department of Computer Science & Engineering

ROOM NO: 203

Class: III CSE –B (II SEM) **Time - Table**

w.e.f: 3-03-2022

Time	9:40 – 10:40	10:40 – 11:40	11:40 – 12:40	12:40 To 1:20	1:20 – 2:15	2:15 – 3:10	3:10 – 4:00
Days	1	2	3		4	5	6
Monday	ML	CD	DAA	L U N C H	STM	ITE	CS
Tuesday	STM	ITE	ML		CD LAB		
Wednesday	CD	ML	DAA		STM LAB		
Thursday	DAA	STM	ITE		CD	ML	CS
Friday	ML LAB				ITE	CD	STM
Saturday	ITE	CD	ML		DAA	DAA	STM

SUBJECT CODE	SUBJECT NAME	FACULTY NAME
ML	Machine Learning	Mrs.P.Sneha
CD	Compiler Design	Mrs.V.Kiranmai
DAA	Design and Analysis of Algorithms	Dr.Vijayarangan
STM	Software Testing Methodologies	Mrs.K.Sandhya
ITE	Information Technology Essentials	Mrs.E.Pavithra
ML LAB	Machine Learning Lab	Mrs.P.Sneha /Mrs. Sharadha/ Mrs. K. Vijayalakshmi
CD LAB	Compiler Design Lab	Mr.K.Mahesh Kumar / Mr.K.Naveenchakravarthy/Mrs.E.Pavithra
STM LAB	Software Testing Methodologies Lab	Mrs.K.Archana /Mr.K.Nagu / Dr.Vijayarangan
CS	Cyber Security	Mr. SNVASRK Prasad

Class Co-Ordinator **HOD**

Mrs.E.Pavithra

Sri Indu College of Engineering &Technology

(An Autonomous Institution under UGC)
Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy (Dist) – 501 510

Department of Computer Science & Engineering

ROOM NO: 204

Class: III CSE-C (II SEM)

Time - Table

w.e.f: 3-03-2022

Time	9:40 – 10:40	10:40 – 11:40	11:40 – 12:40	12:40 To 1:20	1:20 – 2:15	2:15 – 3:10	3:10 – 4:00
Days	1	2	3		4	5	6
Monday	CD LAB			LUNCH	DAA	ML	ITE
Tuesday	ML	DAA	CD		**ITE**	**STM**	**CS**
Wednesday	CD	STM	DAA		ML LAB		
Thursday	STM LAB				CD	ITE	ML
Friday	STM	DAA	CD		ML	CS	ITE
Saturday	ITE	ML	STM		DAA	STM	CD

SUBJECT CODE	SUBJECT NAME	FACULTY NAME
ML	Machine Learning	Mrs.P..Madhavi
CD	Compiler Design	Dr.C.Kotteeswaran
DAA	Design and Analysis of Algorithms	Mrs.Rangamma
STM	Software Testing Methodologies	Ms.G.Swarnalatha
ITE	Information Technology Essentials	Dr. Ch. Narasimha Charay
ML LAB	Machine Learning Lab	Mrs. Sharadha/ Mrs. K. Vijayalakshmi / Mrs.R.Sowmya /
CD LAB	Compiler Design Lab	Mr.K.Naveenchakravarthy /Mr.K.Mahesh Kumar / Dr.C.Kotteeswaran
STM LAB	Software Testing Methodologies Lab	Ms.G.Swarnalatha /Mrs.K.Archana/ Mr.K.Nagu
CS	Cyber Security	Mr. SNVASRK Prasad

Class Co-Ordinator
Mrs.Rangamma

HOD

Sri Indu College of Engineering &Technology

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Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy (Dist) – 501 510

Department of Computer Science & Engineering

ROOM NO: 205

Class: III CSE –D (II SEM)

Time - Table

w.e.f: 3-03-2022

Time	9:40 – 10:40	10:40 – 11:40	11:40 – 12:40	12:40 To 1:20	1:20 – 2:15	2:15 – 3:10	3:10 – 4:00
Days	1	2	3		4	5	6
Monday	STM	DAA	ITE	L U N C H	CD LAB		
Tuesday	ITE	CD	ML		STM	DAA	ML
Wednesday	ML LAB				DAA	CS	STM
Thursday	DAA	ITE	ML		STM LAB		
Friday	ML	CD	DAA		ITE	STM	CD
Saturday	CD	STM	CS		ML	CD	ITE

SUBJECT CODE	SUBJECT NAME	FACULTY NAME
ML	Machine Learning	Mrs.Madhavi
CD	Compiler Design	Dr.C.Kotteeswaran
DAA	Design and Analysis of Algorithms	Mrs.Rangamma
STM	Software Testing Methodologies	Ms.G.Swarnalatha
ITE	Information Technology Essentials	Dr. Ch. Narasimha Charay
ML LAB	Machine Learning Lab	Mrs.M.Madhavi /Mrs.M. Sharadha/ Mrs. K. Vijayalakshmi,
CD LAB	Compiler Design Lab	Mr.K.Naveenchakravarthy / Mr.K.Mahesh Kumar / Dr.C.Kotteeswaran
STM LAB	Software Testing Methodologies Lab	Mrs.K.Archana/Mr.K.Nagu /Mrs.Rangamma
CS	Cyber Security	Mr. SNVASRK Prasad

Class Co-Ordinator
Ms.G.Swarnalatha

HOD

Sri Indu College of Engineering &Technology

(An Autonomous Institution under UGC)

Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy (Dist) – 501 510

Department of Computer Science & Engineering

LAB Time - Table

w.e.f: 3-03-2022

Time	9:40 – 10:40	10:40 – 11:40	11:40 – 12:40	12:40 To 1:20	1:20 – 2:15	2:15 – 3:10	3:10 – 4:00
Days	1	2	3		4	5	6
Monday	CD LAB-CSE-C			L U N C H	CD LAB-CSE-D/ ML LAB-CSE-A		
Tuesday	CD LAB-CSE-A				CD LAB-CSE-B		
Wednesday	ML LAB-CSE-D/ STM LAB-CSE-A				ML LAB-CSE-C/STM LAB – CSE-B		
Thursday	STM LAB-CSE-C				STM LAB-CSE-D		
Friday	ML LAB-CSE-B						
Saturday							

HOD (CSE)

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech. - III Year – II Semester

L	T	P	C
3	1	0	4

(R18CSE3202) Compiler Design

Objectives:

- To describe the steps and algorithms used by language translators.
- To discuss the effectiveness of optimization.
- To explain the machine dependent aspects of Compilation

UNIT – I

Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

Top down Parsing: Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

UNIT – II

Bottom up parsing : Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

UNIT – III

Semantic analysis : Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

Symbol Tables : Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

UNIT – IV

Code optimization : Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

Data flow analysis : Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

UNIT – V

Object code generation : Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

TEXT BOOKS :

1. Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

Sub. Code & Title	(R18CSE3202) Compiler Design

Academic Year: 2020-21	Year/Sem./Section	III/II/A&B&C&D
Faculty Name & Designation	1. (V.KIRANMAI) ASST.PROF, 2. (G.NATARAJASHEKHAR) ASST.PROF, 3. (P.CHAITHANYA) ASST.PROF	

LIST OF TEXT BOOKS AND REFERENCES

TEXT BOOKS:

T1--Principles of compiler design -A.V. Aho . J.D.Ullman; Pearson Education.

T2--Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

REFERENCE BOOKS:

R1--lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly

R2--Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech

R3--Engineering a Compiler-Cooper & Linda, Elsevier.

R4--Compiler Construction, Louden, Thomson.

Web links

W1: https://nptel.ac.in/courses/106/105/106105190/

W2: https://nptel.ac.in/courses/106/108/106108113/

W3: https://nptel.ac.in/courses/106/104/106104123/

W4: https://nptel.ac.in/courses/106/108/106108052/

W5: https://nptel.ac.in/noc/courses/noc19/SEM1/noc19-cs01/

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	SRI INDU COLLEGE OF ENGG & TECH **LESSON PLAN** **(Regulation :R18)** **Department of computer Science and Engineering**	Prepared on Rev1: **Page: 1 of 4**
	Sub. Code & Title | **(R20CSE3202)Compiler Design**	
	Academic Year: 2021-22 | **Year/Sem./Section** | III/II/A&B&C&D	
	Faculty Name & Designation | **1. (V.KIRANMAI) ASST.PROF,** **2. (K.ANJANEYULU) ASST.PROF,**	

Unit/ Item No.	Topic (s)	Book Reference	Page (s) From	Page (s) To	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
	UNIT – I							
I	Introduction to Compiler:					19		
1.1	Introduction to Compiler	T1	1.1	1.1	Black board	1		CO2/L2
1.2	Phases of compilation	T1	1.1.1	1.1.3	Black board	1		CO2/L2
1.3	Lexical Analysis and Introduction of Grammar	T1	1.2	1.2	Black board	1		CO1/L1
1.5	Finite Automata and Regular Grammar with examples.	T1	1.2.2	1.2.2	Black board	2		CO2/L2
1.6	Regular Expression for common programming language.	T1	1.2.2	1.2.2	Black board	1		CO1/L1
1.7	Comparsion of Passes and Phases of Translation.	T1	1.5	1.5	Black board	1		CO1/L1
1.8	Interpreter and Differnce between compiler and interpreter.	T1	2.3	2.3	Black board	1		CO1/L1
1.9	Discussing about Bootstrapping with example	T1	2.3.2	2.5	Black board	1		CO2/L2
1.10	Data Structures in compilation,LEX-lexical analyzer Generator.	T1	2.6	2.8	Black board	1		CO2/L2
1.11	Introduction to parsing and their types.	T1	8.1	8.2	Black board	2		CO2/L2
1.12		T1	8.3.1	8.3.2	Black board	2		CO6/L6
1.13	Top Down parsing with examples	T1	8.3.1	8.3.2	Black board	1		CO6/L6
1.14	Backtracking and LL(1) Parser with example	T1	8.3.1	8.3.2	Black board	2		CO6/L6
	Recursive Decent parsing and predictive parsing	T1	8.33	8.3.4	Black board	1		CO2/L2
	Preprocessing steps for predictive parsing and context free grammar.	T1	8.4.1	8.4 .2	Black board	1		CO5/L5

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO
	UNIT –II							
II	**Unit-II**					**12**		
2.1	Introduction to Bottom Up parsing with their types.	T1	9.1	9.2	Black board	1		CO2/L2
2.2	Shift Reduce Parsing with example	T1	10.1	10.2	Black board	2		CO3/L3
2.3	LR Parsing with example	T1	10.3	3.48	Black board	2		CO4/L4
2.4	LALR Parsing with example	T1	10.5	10.6	Black board	2		CO4/L4
2.5	Error recovery in parsing	T1	11.3	11.3.2.	Black board	1		CO1/L1
2.6	Dicussing about Ambiguous Grammer	T1	11.4	11.4.4	Black board	1		CO1/L1
2.7	How to handle the ambiguous Grammar	T1	12.1	12.1.1	Black board	1		CO1/L1
2.8	Implement YACC-Yet another compiler-compiler	T1	12.1	12.1.2	Black board	2		CO3/L3
	Review	**Signature of the HOD/Coordinator**						
	UNIT- III							
III	Introduction to semantic analysis					**12**		CO
3.1	Implementing the intermediate forms of sourrce programs with abstract syntax tree.	T1	18.4	18.4.5	Black board	1		CO1/L1
3.2	Discussion about the polish notation and three address codes	T1	19.1	19.1.2	Black board	1		CO2/L2
3.3	Introduction to attributed grammars.	T1	19.1	19.1.4	Black board	1		CO2/L2
3.4	Discussing about the syntax directed translation	T1	19.3.1	19.3.4	Black board	1		CO3/L3
3.5	Conversion of popular programming languages and that language constructed in to intermediate code forms and type checker.	T1	19.2	19.2.3	Black board	1		CO3/L3
3.6	Introduction to symbol tables format and organization of block structures languages.	T1	21.5	21.5.3	Black board	1		CO3/L3
3.7	Implementing the hashing tree strutures and representation of scope information	T1	22.1	22.3	Black board	1		CO3/L3
3.8.	Introdution to block structures and non block structures storage allocation	T1	22.2	22.2	Black board	1		CO1/L1
3.9	Discussing static, runtime stack and heap storage allocation	T1	22.3	22.3	Black board	1		CO6/L6
3.10	Introduction to storage allocation for arrays, strings and Records	T1	22.4	22.4	Black board	2		CO2/L2
3.11	Introduction to semantic analysis	T1	22.4	22.4	Black board	1		CO1/L1

	Review	**Signature of the HOD/Coordinator**						
	UNIT-IV							**CO**
IV	**Code Optimization**					**12**		CO1/L1
4.1	Introduction to code optimization	T1	6.1	6.5	Black board	2		CO2/L2

4.2	Consideration for optimization	T1	6.11	6.14	Black board	1		CO3/L3
4.3	Scope of optimization	T1	6.30	6.58	Black board	1		CO4/L4
4.4	Discussing about the local and global optimization, loop optimization	T1	6.27	6.70	Black board	2		CO4/L4
4.5	Implementing the frequency reduction	T1	24.3.9	24.3.10	Black board	1		CO1/L1
4.7	Introduction to folding and DAG	T1	30.3	30.3.5	Black board	1		CO1/L1
4.8	Implementing the DAG representation	T1	30.4	30.4.3	Black board	2		CO1/L1
	Introduction to Data Flow analysis	T1						
	Introduction to Flow graph and data flow equation	T1						
	Discussing about the edundant sub expression elimination	T1						
	Induction variable elements and live variable analysis	T1						
	Copy propagation	T1						
UNIT-V								
V	**Code Generation**					**10**		
5.1	Introduction to object code generation	**T1**	26.6	26.6.1	Black board	01		CO1/L1
5.2	How object code forms are generating	T1	26.6.2	26.6.3	Black board	01		CO2/L2
5.3	Types of machine dependent and independent code optimi zation	T1	26.3	26.3.3	Black board	01		CO3/L3
5.4	Introduction to register allocation	T1	26.2	26.2.4	Black board	02		CO4/l4
5.5	Implementing the assignment generic code generation algorithms	T1	26.1	26.1.2	Black board	02		CO6/L6
	Review	**Signature of the HOD/Coordinator**						

Expected Total No. of classes = 67

QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)

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

UNIT-I

UNIT-1 : Introduction to Compiler Design			
	1MARK QUESTIONS	**BT Level**	**Course Outcome**
1.	Define Compiler briefly?	2	CO2
2.	Define Lexical Analysis?	2	CO2
3.	List out the phases of compiler?	1	CO1
4.	Define the term Symbol table?	2	CO2
5.	How to define Context Free Grammar?	1	CO1
6.	Difference between compiler and Interpreter?	4	CO4
7.	What is a Regular Grammar?	1	CO1
8.	Define Finite Automata with 5 tuples?	1	CO1
9.	Define parse tree?	2	CO2
10.	Define Bootstrap?	2	CO2
5 MARKS QUESTIONS			
1.	Define compiler? State the various phases of compilers?	2	CO2
2.	Explain the various phases of a compiler in detail? And also write down the output for the following for each phase? **Position = initial + rate *50**	2	CO2
3.	Define Lex tool? Explain the general format of a Lex Program?	1	CO2
4.	Define about Finite Automata and their types of Finite Automata with an example?	1	CO2
5.	Write the Recursive Descent parsing for the following grammar? And draw the parse tree for input string is w=id*(id+id)?**(Remembering)** **E→E+E/T T->T*F/F F->(E)/id**	2	CO2
6.	Define Backtracking? Construct the parse tree for the String "accd" using backtracking and also explain the ambiguous grammar with example.? **S->aAd/aB A->b/c B->ccd/ddc**	1	CO1
7.	Define LL(1)? Construct the LL(1) parsing table for the following grammar? **E->**	6	CO6

	TE' **E'->+TE'/€** **T->FT'** **T'->*FT'/€** **F->(E)/id**		
8	What are the major Data Structures of Compilation? Explain in detail?	1	CO1
9	Consider the following fragment of a C code float i,j; i= i*70+j+2; Write the output at all phases of the compiler for the above C code	3	CO3
10	. What are the problems associated with top down parsing? Briefly explain Left Recursion & Left factoring with a suitable example.	1	CO1

Unit -II			
1 MARK QUESTIONS			
1.	Specify the basic principle of Bottom up parser(C)	4	CO4
2.	Draw the structure of Bottom up parsing table	1	CO1
3.	Specify the need for automatic parser generators	2	CO2
4.	Give an example for handle	3	CO3
5.	Define handle pruning.	1	CO1
6.	Which type of parsing table builds up by YACC parser generator?	4	CO4
7.	Differentiate LR(1) from LL(1) in one statement	4	CO4
8.	How the LALR (1) differs from LR (1)	4	CO4
9.	When will the reduce action is taken up by the Shift-reduce parser	4	CO4
10.	Specify the state of the CFG, if there was a conflict in the Bottom up parsing table	4	CO4
5 MARKS QUESTIONS			
1	Distinguish between Top-Down Parsing **Vs** Bottom Up Parsing.(**Analyze)**	4	CO4
2.	What is Shift-Reduce parser and construct Shift Reduce Parser for the input string **id*id+id** by using the grammar. (Create) **E-> E+E** **E-> E*E** **E-> (E) |id**	6	CO4
3.	Why we need LR parser and explain the working of LR parser.	2	CO2
4.	Explain the working of SLR parser? construct SLR Parsing table for the following grammar(Apply) **E-> E+T/T** **T-> T*F/F** **F-> (E)/id**	3	CO3

5.	Construct the Canonical LR (CLR) parser for the following grammar? **S→ CC C→ bC | d**	6	CO6
6.	Explain about error recovery in LR parsers.	2	CO2
7.	Construct the parsing table of LALR(1) for the following grammar **S->L=R | R** **L->*R** **R->L**	6	CO6
8	Distinguish between LR, CLR and LALR parsers.	4	CO4
9	Briefly explain about the Automatic Parser Generator – YACC.	2	CO2
10	Ambiguity in the LR parsing table w.r.to taking action is handled by using **Operator Precedence and Associativity**principle **–** Justify**.**	5	CO5
Unit – III			
1 MARK QUESTIONS			
1.	What is Syntax Directed Definition (SDD).	1	CO1
2.	How an Intermediate Code gets generated.	2	CO2
3	What is an Annotated Tree?	1	CO1
4.	How Synthesized Attribute differs from Inherited Attribute.	4	CO4
5	Give an example for Abstract Syntax Tree.	3	CO3
6.	Define Inherited Attribute.	1	CO1
7	Give an example for Semantic checks.	3	CO3
8.	Give an example for S-attributed and L-attributed grammar.	3	CO3
9.	POSIX is the technique used to represent the intermediate code - Justify.	5	CO5

10.	Develop three address code for the expression a+b*c – d /e.	6	CO6
	5 MARKS QUESTIONS		
1.	Explain the role of Semantic Analyzer in compilation with an example.	2	CO2
2	What is difference between Semantic and Syntax analysis?	1	CO1
3.	1. Construct the syntax tree for the grammar given using Syntax Directed Translation.**E→ E+T** **E→E*T E→T T→(E) T→id T→num**	6	CO6
4	Write an S-attributed grammar to connect the following grammar with prefix rotator. **L→ E E→ E+T|E-T|T T→ T*F|T/F|F** **F→ P ↑ P|P P→ (E)** **P→ id**	6	CO6
5.	Check whether the given SDD is L-attributed or Not. A→ PQ P.in:= p(A.in) Q.in:= q(P.in) A.sy:= f(Q.sy) A→XY Y.in:= y(A.in) X.in:= x(Y.in) A.sy:=f(X.sy)	5	CO5
6	What is an Abstract Syntax Tree. Give the procedure for constructing syntax tree for an expression with suitable example.	1	CO11
7	What is an intermediate code form and briefly explain about three address codes.	2	CO2

8	Distinguish between static and dynamic storage allocation?	2	CO2
9	What is an intermediate code form and briefly explain about three address codes.	2	CO2
10	Convert the arithmetic expression **b*3*(a+b)** into syntax tree and three address code.	3	CO3

UNIT-IV			
1.	Define code Optimization?	2	CO2
2.	Define common sub expression?	2	CO2
3.	Explain Dead code?	2	CO2
4.	Differentiate Machine independent and machine dependent optimization?	1	CO1
5.	Explain about Loop optimization?	2	CO2
6.	Differentiate local and global optimization?	1	CO1
7.	Define constant folding?	2	CO2
8.	Define flow graph?	2	CO2
9.	Define DAG?	2	CO2
10.	Mention the issues to be considered while applying the techniques for code optimization?	2	CO2
5 MARKS QUESTIONS			
1.	What is the necessity of code optimization and how it can be organized?	2	CO2

2.	What is a basic block and explain the construction of basic blocks for the given code with an example?	2	CO2
3.	What is local optimization and explain about Common Sub Expression Elimination and Copy Propagation.	2	CO2
4.	What is loop optimization and explain about loop unrolling and strength reduction.	2	CO2
5.	What is local optimization and explain about Dead Code Elimination and Constant Folding.	6	CO6
6.	Explain about global optimization with control flow and data flow analysis?	4	CO4
7.	What is a Flow Graph and explain about Reducible and Non-Reducible flow graphs.	4	CO4
8	What is DAG and explain the process of constructing the DAG with an example.	2	CO2
9	Explain live variable analysis algorithm with example?	2	CO2
10	Explain about common sub Expression elimination, copy Propagation and Induction variable elimination through DAG.	2	CO2

Unit-V:			
1 MARK QUESTIONS			
1.	Explain about machine independent and machine dependent optimization?	1	CO1
2.	Explain the role of code generator in a compiler?	2	CO2
3.	Explain the instructions and address modes of the target machine?	2	CO2
4.	Show the code sequence generated by the simple code generation algorithm? **u = a-c v = t+u d = v + u/d**	3	CO3
5.	Mention the properties that a code generator should process**.**	4	CO4
6.	Generate the code for x=x+1 for the target machine**?**	2	CO2
7.	Explain relocatable machine code**?**	2	CO2
8.	List out the characteristics of peephole optimization?	2	CO2
9.	Define linker and loader?	2	CO2
10.	Explain about Top down parsing?	2	CO2
5 MARKS QUESTIONS			
1.	Explain the issues in the design of a code generator.	2	CO2
2.	What is an addressing mode? Explain about various addressing modes.	2	CO2
3.	Explain about peep hole optimization.	2	CO5
4	What is machine dependent code optimization and list out various techniques in it.	4	CO4

5.	What is an object mode. Explain about various object code forms.	4	CO4
6.	Briefly explain the strategies available for register allocation and assignment.	2	CO2
7.	Explain three peephole optimization with suitable example?	2	CO2
8	1. Generate the code for the following c statement? i) X= f(a) + f(a) +f(a) ii) X= f(a)/g(b,c) iii) X= f(f(a)) iv) X= ++ f(a)	6	CO6
9	2. Generate the code for the following statements? i) x=a[i] +1 ii) a[i]= b[c[i]] iii) a[i][j]=b[i][k]*c[k][j] iv) a[i]=a[i]+b[j]	6	CO6
10	1. How is object code different from intermediate code generation? What are the factors to be considered in object code generation? Explain. **(Understand)**	2	CO2

BR-18 **Write Your Ht.No.**

ASSIGNM ENT QUETIONS

1. Define Compiler briefly? **(Understand)** **1M**

2. Define Finite Automata with 5 tuples? **(Remember)**

3 Specify the basic principle of Bottom up parser.**(Analyze)**

3. Define Inherited Attribute. **Remember)**

4. Define DAG? (**Understand**)

1. Define compiler? State the various phases of compilers? **(Understanding)** **5M**

2. Explain the issues in the design of a code generator. (**understand**)

3. Explain the working of SLR parser? construct SLR Parsing table for the following grammar**.(Apply)**

E-> E+T/T

T-> T*F/F

F-> (E)/id

4What is an Abstract Syntax Tree. Give the procedure for constructing syntax tree for an expression with suitable example.(**Remember)**

5 What is local optimization and explain about Common Sub Expression Elimination and Copy Propagation.(**Understand**)

D4

BR-18

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

III B.Tech. - II Semester - II Mid-Term Examinations, August – 2021.

(R18CSE3202)

Dt : 06-08-2021 –

(Day - 1 AN)

COMPILER DESIGN (For CSE)

Duration: 90Mins **Max Marks: 25M**

Section – A

Answer *All* the questions. **Marks: 5Qx1M = 5M**

1. List different data structures used for symbol table.
2. Define code Optimization.
3. Differentiate Machine independent and machine dependent optimization.
4. Explain the instructions and address modes of the target machine.
5. Explain relocatable machine code.

Section – B

Answer any *FOUR* questions. **Marks: 4Qx5M = 20M**

6. Distinguish between static and dynamic storage allocation.
7. What is a basic block? And explain the construction of basic blocks for the given code with an example.
8. What is DAG? and explain the process of constructing the DAG with an example.
9. What is an object mode? Explain about various object code forms.
10. What is an addressing mode? Explain about various addressing modes.
11. Explain the issues in the design of a code generator.

BR-18 **Write Your Ht.No.** **D 4**

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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

III B.Tech. II Semester (REGULAR) End Examinations, Aug. / Sept. – 2021.

(R18CSE3202) COMPILER DESIGN

26/08/2021 **(For CSE)**

Duration: 3 Hrs **Maximum Marks: 70M**

Answer any <u>FIVE</u> questions from the following. ***(5Qx14M =70M)***

1. Explain the three general approaches for the implementation of a Lexical analyzer.

2. Draw a block diagram of phases of a compiler and indicate the main functions of each phase.

3. What are the common conflicts that can be encountered in shift reduce parsers? Explain.

4. Write the algorithm to construct LALR parser and explain the same with grammar.
   S→L=R|R L→*R|id R→L.

5. Discuss various methods to get the evaluation order of semantic rules.

6. Explain in brief about Stack and Heap Storage allocation strategies.

7. Explain in detail the procedure that eliminates global common sub-expression.

8. Explain the different issues in the design of a code generator.

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NAAC
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

HANDOUT

Third Year CSE - Semester II

R20CSE3203 – Design and Analysis of Algorithms

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR- 2022- 23

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

HANDOUT- INDEX

S. No	Contents
1	Vision, Mission, PEOs, POs, PSOs & 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.

COs MAPPING WITH POs & PSOs

Academic Year: **2022-23**

Class: **III YEAR, II SEM.**

Course Name: **R20CSE3203 - Design and Analysis of Algorithms**

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

	CO Statement
C323.1	Justify the performance of algorithms through performance analysis, Probabilistic analysis and Amortized analysis.(K5 - Evaluate)
C323.2	Examines the general method of divide and conquer approach on various searching, sorting and general applications.(K3 - Apply)
C323.3	Illustrate the various graph and tree traversal techniques.(K4 - Analyze)
C323.4	Justify the algorithm design method of greedy and dynamic programming approach on various applications.(K5 - Evaluate)
C323.5	Analyze the Backtracking, Branch and Bound algorithm design methods on various applications. (K4 - Analyze)
C323.6	Differentiate the NP-Hard and NP-Complete Problems. (K4 - Analyze)

Course Articulation Matrix

CO	PO												PSO		
	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**
C323.1	2	2	1	3	3	-	-	-	-	-	-	-	-	1	-
C323.2	3	1	1	1	3	-	-	-	-	-	-	-	-	1	1
C323.3	1	3	3	-	1	-	-	-	-	-	-	-	-	-	-
C323.4	1	-	2	3	3	-	-	-	-	-	-	-	-	1	-
C323.5	2	3	3	2	1	-	-	-	-	-	-	-	1	1	1
C323.6	1	3	3	2	1	-	-	-	-	-	-	-	-	1	-
C323	**1.66**	**2.4**	**2.16**	**2.2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**1**

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NBA & NAAC 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/III B.Tech Academic Calendar/307/2022 **Dt: 03.08.2022**

Dr.G. SURESH,
Principal,

To,
All the HODs.

III B.TECH I SEM & II SEM ACADEMIC CALENDAR
ACADEMIC YEAR : 2022-23

Sir,

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for **B.Tech – 3rd Year** - For the academic year **2022-23** – Reg.

***

The approved Academic Calendar for **B.Tech – 3rd Year (I & II Sem)** for the academic year **2022-23** is given below:

Academic Calendar for B.Tech – 3rd Year Students
(2020 - 21 Batch), BR-20 Regulation.

I - Semester

Commencement of I Semester class work	**25.08.2022 (Thursday)**	
I Spell of Instructions. (Including CRT and Dussehra Holidays).	25.08.2022	02.11.2022 - 10 Weeks
Dussehra Holidays.	03.10.2022	08.10.2022 - 1 Week
I Mid Examinations for III B.Tech I Sem Students.	03.11.2022	05.11.2022 - 3 Days
II Spell of Instructions.	07.11.2022	31.12.2022 - 8 Weeks
II Mid Examinations for III B.Tech I Sem Students.	02.01.2023	04.01.2023 - 3 Days
Preparation Holidays, Practical Lab Examinations and Remedial Mid Test (RMT).	05.01.2023	18.01.2023 - 2 Weeks
Sankranti Holidays	13.01.2023	16.01.2023 - 4 Days
III B.Tech I Semester End Examinations (Main) and Supplementary Examinations.	19.01.2023	01.02.2023 - 2 Weeks
Commencement of class work of III B.Tech II Semester - 02.02.2023 (Thursday)		

II - Semester

Commencement of II Semester class work	**02.02.2023 (Thursday)**	
I Spell of Instructions.	02.02.2023	29.03.2023 - 8 Weeks
I Mid Examinations for III B.Tech II Sem Students.	31.03.2023	03.04.2023 - 3 Days
II Spell of Instructions (Including Summer Vacation).	04.04.2023	12.06.2023 - 10 Weeks
Summer Vacation.	15.05.2023	27.05.2023 - 2 Weeks
II Mid Examinations for III B.Tech II Sem Students.	13.06.2023	15.06.2023 - 3 Days
Preparation Holidays, Practical Lab Examinations and Remedial Mid Test (RMT).	16.06.2023	25.06.2023 - 10 Days
III B.Tech II Semester End Examinations (Main) and Supplementary Examinations.	26.06.2023	08.07.2023 - 2 Weeks
Commencement of class work of IV B.Tech I Semester - 10.07.2023 (Monday)		

ACE CE DIRECTOR PRINCIPAL

Copy to DAE
Copy to all the Heads of the Depts.

CONTROLLER OF EXAMINATIONS
Sri Indu College of Engineering & Technology
(An Autonomous Institution under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R. Dist-501510.

DIRECTOR
(Academic Audit)
Sri Indu College of Engineering & Technology
Sheriguda, IBP, R.R. Dist-501510.

PRINCIPAL
Sri Indu College of Engineering & Technology
(An Autonomous Institution under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R. Dist-501510.

COMPUTER SCIENCE AND ENGINEERING

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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B.Tech. - III Year – II Semester

L	T/P/D	C
3	-/1/-	4

(R20CSE3203) DESIGN AND ANALYSIS OF ALGORITHMS

The course objectives are:

- To analyze performance of algorithms.
- To choose the appropriate data structure and algorithm design method for a specified
- application.
- To understand how the choice of data structures and algorithm design methods
- impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide
- and conquer, dynamic programming, backtracking and branch and bound.
- Prerequisites (Subjects) Data structures, Mathematical foundations of computer science

UNIT -I:

Introduction: Algorithm, Psuedo code for expressing algorithms, *Performance Analysis*:-Space complexity, Time complexity, *Asymptotic Notations*:- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

Divide and conquer: General method, *applications:*-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

UNIT -II:

Searching and Traversal Techniques: Efficient non-recursive binary tree traversal algorithm, **Disjoint Sets:** Disjoint set operations, union and find algorithms, Spanning trees, Graph traversals – Breadth first search and Depth first search, AND/OR graphs, game trees, Connected Components, Bi-connected components.

UNIT -III:

Greedy method: General method, *applications*-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Dynamic Programming: General method, *applications*- Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT -IV:

Backtracking: General method, *applications:-* n-queen's problem, sum of subsets problem, graph coloring.

Branch and Bound: General method, *applications* - Travelling sales person problem, *0/1 knapsack problem* - LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT -V:

NP-Hard and NP-Complete problems: *Basic concepts*:- non deterministic algorithms, NP - Hard and NP-Complete classes, Cook's theorem

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

Department of Computer Science and Engineering

Prepared on:10-02-23
Rev1:

Sub. Code & Title	**R20CSE3203 Design and Analysis of Algorithms**
Academic Year: 2022-23	**Year/Sem./Section** **III-II/A,B,C,D**
Faculty Name & Designation	**Dr. S.Vijayarangam , Associate Professor/CSE**

Unit/ Item No.	Topic (s)	Book Reference	Page (s) From	Page (s) To	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
	UNIT-I							
I	**Introduction to Algorithms & Divide and Conquer**					**14**		
1.1	Introduction to Algorithms	T1	1	4	Black board	02		CO1, L1
1.2	Psuedo code for expressing algorithms	T1	5	12	Black board	01		CO1, L1
1.3	Performance Analysis – Space complexity , Time complexity	T1	14	26	Black board	01		CO1, ,L1
1.4	Asymptotic Notations	T1	39	47	Black board	02		CO1, L1
1.5	Probabilistic Analysis	T1	62	66	Black board	01		CO1,L5
1.6	Amortized Analysis	T1	62	74	Black board	01		CO1, L5
1.7	Divide and Conquer : General Method	T1	136	140	Black board	01		CO2, L3
1.8	Applications : Binary Search	T1	145	152	Black board	01		C02,L3
1.9	Quick Sort	T1	168	174	Black board	O2		CO2,L3
1.10	Merge Sort	T1	159	167	Black board	01		CO2,L3
1.11	Strassen's Matrix Multiplications	T1	192	194	Black board	01		CO2,L3
	Review	**Signature of the HOD/Coordinator**						
	UNIT –II							
II	**Searching and Traversal Techniques**					**10**		
2.1	Non recursive binary tree traversal algorithm	T1			Black board	01		CO3, L4
2.2	Disjoint set operations	T1	110	119	Black board	01		CO 3, L4
2.3	Union and Find Algorithms	T1	110	119	Black board	01		CO 3, L4
2.3	Spanning Trees	T1	345	347	Black board	02		CO 3, L4
2.4	Graph Traversals , AND / OR Graphs	T1	339	344	Black board	02		CO3, L4
2.5	Game Trees	T1			Black board	01		CO 3, L4
2.6	Connected componemts , Biconnected Componets	T1	349	356	Black board	02		CO3, L4
	Review	**Signature of the HOD/Coordinator**						

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

Prepared on:10-02-23
Rev1:

Sub. Code & Title	**R20CSE3203 Design and Analysis of Algorithms**
Academic Year: 2022-23	**Year/Sem./Section** **III-II /A,B,C,D**
Faculty Name & Designation	**Dr. S.Vijayarangam , Associate Professor/CSE**

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
	UNIT- III							
III	**Greedy Method And Dynamic programming**					**12**		
3.1	Greedy Method : General Method	T1	210	213	Black board	01		CO4,L5
3.2	Applications : Job Sequencing with Dead Lines	T1	227	233	Black board	01		CO4, L5
3.3	0/1 Knapsack Problem	T1	218	221	Black board	01		CO4,L5
3.4	Minimum Cost Spanning Trees	T1	236	246	Black board	01		CO4, L5
3.5	Single Source Shortest Path Problem	T1	260 288	266 291	Black board	01		CO4, L5
3.6	Dynamic Programming : General Method	T1	272	276	Black board	01		CO4, L5
3.7	Applications : Matrix Chain Multiplication	T1			Black board	01		CO4, L5
3.8	Optimal Binary Search Trees	T1	293	301	Black board	01		CO4, L5
3.9	0/1 Knapsack Problem	T1	305	312	Black board	01		CO4, L5
3.10	All pairs Shortest Path Problem	T1	284	287	Black board	01		CO4, L5
3.11	Travelling Sales Person Problem	T1	318	320	Black board	01		CO4, L5
3.12	Reliability Design	T1	315	317	Black board	01		CO4, L5
	Review	**Signature of the HOD/Coordinator**						
	UNIT- IV							
IV	**Backtracking and Branch and Bound**					**11**		
4.1	Backtracking : General Method	T1	359	372	Black board	01		CO5, L4
4.2	Applications : N – Queen problem	T1	373	375	Black board	02		CO5, L4
4.3	Sum of Subsets Problem	T1	377	379	Black board	01		CO5, L4
4.4	Graph Coloring	T1	380	383	Black board	01		CO5, L4
4.5	Hamiltonian Cycles	T1	384	387	Black board	01		CO5, L4
4.6	Branch and Bound : General method	T1	399	412	Black board	02		CO5, L4
4.7	Applications : Travelling sales Person Problem	T1	422	429	Black board	01		CO5, L4
4.8	0/1 Knapsack Problem – LC Branch and Bound , FIFO Branch and Bound solution	T1	413	420	Black board	02		CO5, L4
	Review	**Signature of the HOD/Coordinator**						
	UNIT- V							
V	NP Hard and NP Complete Problems					**06**		
5.1	Basic Concepts	T1	514	515	Black board	01		CO6,L2
5.2	Non Deterministic Algorithms	T1	515	523	Black board	01		CO6, L2

5.3	NP – Hard and NP Complete Classes	T1	523	526	Black board	02		CO6, L2
5.4	Cook's Theorem	T1	527	535	Black board	02		CO6, L2
	Review	**Signature of the HOD/Coordinator**						

	SRI INDU COLLEGE OF ENGG & TECH **LESSON PLAN** **(Regulation :R20)** **Department of Computer Science and Engineering**	
Sub. Code & Title	**(R20CSE3203) DESIGN AND ANALYSIS OF ALGORITHMS**	
Academic Year: 2022-23	**Year/Sem./Section**	**III/II/ A,B,C & D.**
Faculty Name & Designation	**Dr.S.Vijayarangam, Associate Professor,**	

LIST OF TEXT BOOKS AND REFERENCES

TEXT BOOKS:

T1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press.

T2. Foundations of Algorithm, 4th edition, R.Neapolitan and K.Naimipour, Jones and Barlett Learning

T3. Design and Analysis of Algorithms, P.H.Dave, H.B.Dave, Pearson Education, 2008.

REFERENCE BOOKS:

R1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.

R2. Introduction to Algorithms, third edition, THOMAS H. COREMEN, CHARLE .E. LEISERSON, RONALD L. RIVEST, and CLIFFORD STEIN, PHI Pvt. Ltd./ Pearson Education.

R3 Algorithm Design: Foundations, Analysis and Internet Examples, M.T.Goodrich and R. Tamassia, John Wiley and sons.

R4. Computer Algorithms, Introduction to Design and Analysis, 3rd edition, Saara Baase, Van, Gelder , Pearson Eduction.

R5 Fundamentals of Sequential and Parallel Algorithms, K.A.Bermanand J.L.Paul Comp Learning

R6 Introduction to Algorithms, A.Levitin, Pearson Education.

Web links

W1. http://www.engppt.com/search/label/Design%20and%20Analysis%20of%20Algorithms%20.

W2. https://www.cs.princeton.edu/~wayne/kleinberg-tardos/

W3. https://www.cmi.ac.in/~madhavan/nptel-algorithms-2015/

W4. http://cs.uef.fi/pages/franti/asa/notes.html

W5. https://myonlinetext.blogspot.com/2015/12/design-and-analysis-of-algorithms.html

W6. https://docs.google.com/document/d/1S4a8PlYUBJLpBaIDCLDczrTj0dp_7-BxqZmTchQ8f8E/edit

	SRI INDU COLLEGE OF ENGG & TECH **LESSON PLAN** **(Regulation :R20)** **Department of Computer Science and Engineering**	
Sub. Code & Title	**(R20CSE3203) DESIGN AND ANALYSIS OF ALGORITHMS**	
Academic Year: 2022-23	**Year/Sem./Section**	**III/II/ A,B,C & D.**
Faculty Name & Designation	**Dr.S.Vijayarangam, Associate Professor/CSE**	

ASSIGNMENT 1

S.No.	Assignment Questions	Course Outcome	Books To be Referred	Date Of Announcement	Date of Submission
1	What do you mean by performance analysis of an algorithm and Explain	CO-1	T-1	18-4-2023	28-4-2023
2	Define algorithm. Explain the characteristics of the algorithm (remembering)	CO-1	T-1	18-4-2023	28-4-2023
3	Explain Strassen's Matrix multiplication with example.	CO-2	R-1	18-4-2023	28-4-2023
4	Explain different graph representation.	CO-3	T-1	18-4-2023	28-4-2023
5	Two sets S1 and S2 are given as below S1= {1,2,4,6} and S2={7,8} (a) Draw Disjoint sets S1 and S2 using Trees. (b) Draw Disjoint sets S3 such that S3=S1US2 (c) Draw Disjoint sets S4 such that S4=S2US1	CO-3	T-1	18-4-2023	28-4-2023

	SRI INDU COLLEGE OF ENGG & TECH **LESSON PLAN** **(Regulation :R20)** **Department of Computer Science and Engineering**	
	Sub. Code & Title	**(R20CSE3203) DESIGN AND ANALYSIS OF ALGORITHMS**
	Academic Year: 2022-23	**Year/Sem./Section** **III/II/ A,B,C & D.**
	Faculty Name & Designation	**Dr.S.Vijayarangam, Associate Professor/SE**

6	Differentiate between BFS and DFS.	CO-3	T-1	18-4-2023	28-4-2023
7	Explain algorithm to find Biconnected components.	CO-3	T-3	18-4-2023	28-4-2023
8	Solve the following problem of Job sequencing with the dead line specified using Greedy strategy N=4, (p1, p2, p3, p4) = (100, 10, 15, 27) (d1, d2, d3, d4)= (2, 1, 2, and 1).	CO-4	T-3	24-6-2023	7-7-2023
9	Using Backtracking enumerate how can u solve the following problems (a) 8-queens problem (b) Hamiltonian circuit problem.	CO-5	T-1	24-6-2023	7-7-2023
10	Explain the P, NP, NP-Hard and NP-complete classes? Give relationship between them?	CO-6	T-1	24-6-2023	7-7-2023

	SRI INDU COLLEGE OF ENGG & TECH **QUESTION BANK** **(Regulation :R20)** **Department of Computer Science and Engineering**	**(Regulation:R20)**
Sub. Code & Title	**R20CSE3203 Design and Analysis of Algorithms**	
Academic Year: 2022-23	**Year/Sem./Section**	**III - II/A,B,C,D**
Faculty Name & Designation	**Dr.S.Vijayarangam, Associate Professor/CSE**	

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	Describe an algorithm with example?	2	CO1
2.	List out the properties of the algorithm?	1	CO1
3.	What is Space Complexity and Time Complexity?	1	CO1
4.	What is Pseudo code?	1	CO1
5.	List asymptotic notations.?	1	CO1
6.	Define Divide and Conquer.	1	CO2
7.	What is binary search?	1	CO2
8	What is sorting?	1	CO2
9	Analyze time complexity of quick sort?	4	CO2
10	Compute time complexity of Merge sort.	4	CO2
PART B			
10 MARKS QUESTIONS			
1	What do you mean by performance analysis of an algorithm? Explain .	2	CO1
2	Define algorithm. Explain the characteristics of the algorithm .	1	CO1
3	Find Big-oh notation and Little-oh notation for $f(n) = 7n^3 + 50n^2 + 200$.	5	CO1
4	What is meant by time complexity? Define different time complexity notations. Give examples one for each.?	1	CO1
5	Given $f(n)=20n^3-3$, then prove that $f(n)= O(n^3)$.?	5	CO1
6	Explain Binary search algorithm with an example.?	2	CO2
7	Develop general method for Divide and Conquer approach.?	3	CO2
8	Explain Merge sort algorithm using divide and conquer method.	2	CO2
9	Explain Strassen's Matrix multiplication with example.	2	CO2
10	To construct how quick sort sorts the following sequences of keys in ascending order. 22,55,33,11,99,77,55,66,54,21,32.	6	CO2

	SRI INDU COLLEGE OF ENGG & TECH **QUESTION BANK** **(Regulation: R20)** **Department of Computer Science and Engineering**	**(Regulation :R20)**
Sub. Code & Title	**R20CSE3203 Design and Analysis of Algorithms**	
Academic Year: 2022-23	**Year/Sem./Section** **III-II/A,B,C,D**	
Faculty Name & Designation	**Dr.S.Vijayarangam , Associate Professor/CSE**	

	UNIT II		
	PART A		
	1 MARK QUESTIONS	**BT LEVEL**	**COURSE OUTCOME**
1	Define Disjoint set.(remembering)	1	CO3
2.	What is weighting rule for Union.(remembering)	1	CO3
3.	What is Collapsing Rule?(remembering)	1	CO3
4.	Explain different Tree traversals.(understanding)	2	CO3
5.	Write algorithm for simple Union & find Operations.(remembering)	1	CO3
6.	Define Graph.(remembering)	1	CO3
7.	Define Connected component(remembering)	1	CO3
8	Define Biconnected components.(remembering)	1	CO3
9	What is Adjacency Matrix?(remembering)	1	CO3
10	Define Spanning Tree.(remembering)	1	CO3
	PART B		
	10 MARKS QUESTIONS		
1	. Explain the usefulness of the following fundamental operations on sets: (a) FIND (b) UNION	2	CO3
2	Determine weighted union and collapsing find algorithm With an Example.	5	CO3
3	Differentiate between BFS and DFS.	4	CO3
4	Explain the Properties of Depth first search.	2	CO3
5	Write about AND / OR Graphs .	2	CO3
6	Two sets S1 and S2 are given as below S1= {1,2,4,6} and S2={7,8} (a) Draw Disjoint sets S1 and S2 using Trees. (b) Draw Disjoint sets S3 such that S3=S1US2 (c) Draw Disjoint sets S4 such that S4=S2US1	6	CO3
7	Write and explain the find algorithm using collapse rule with an example.	2	CO3
8	Write and explain the UNION algorithm using Weighted rule with an example	2	CO3
9	Explain algorithm for find Biconnected components.	2	CO3
10	Write algorithm to find DFN's and L values.	1	CO3

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

Sub. Code & Title	**R20CSE3203 Design and Analysis of Algorithms**		
Academic Year: 2021-22		**Year/Sem./Section**	**III-II/A,B,C,D**
Faculty Name & Designation	**Dr.S.Vijayarangam , Associate Professor/CSE**		

	UNIT III		
	PART A		
	1 MARK QUESTIONS	**BT LEVEL**	**COURSE OUTCOME**
1	Give two real time problems that could be solved using greedy algorithm.	5	CO4
2.	Define greedy method.	1	CO4
3.	What is minimum cost spanning tree?	1	CO4
4.	What is job sequencing?	1	CO4
5.	Define knapsack problem.	1	CO4
6.	What is dynamic programming?	1	CO4
7.	8. Write general method of dynamic programming.	1	CO4
8	9. What is optimal binary search tree?	1	CO4
9	Find the minimum cost spanning tree of the given weight graph. 1 1 3 2 3 2	5	CO4
10	What is travelling sales man problem.	1	CO4
	PART B		
	10 MARKS QUESTIONS		
1	Explain Job sequencing algorithm with an example	2	CO4
2	Explain 0/1 knapsack problem with example.	2	CO4
3	Explain kruskal's algorithm with an example.	2	CO4
4	Explain Prim's algorithm with an example.	2	CO4
5	Explain minimum cost spanning tree.	2	CO4
6	Explain about single source shortest path algorithm with an example	2	CO4
7	Compare Divide and Conquer approach and greedy method	4	CO4
8	Solve the following problem of Job sequencing with the dead line specified using Greedy stratergy: N=4, (p1, p2, p3, p4)=(100,10,15,27) (d1, d2, d3, d4)= (2,1,2,1).	5	CO4
9	Find the optimal solution for the given instance of knapsack problem. n=7,m=15, (p1, p2, p3, p4, p5, p6,p7)=(10,5,15,7,6,8,3) (w1, w2, w3,w4, w5,w6,w7)= (2,3,5,7,1,4,1) Find the optimal solution for a. Maximum profit. b. Minumum weight.	5	CO4
10	Illustrate Reliability Design .	4	CO4

	SRI INDU COLLEGE OF ENGG. & TECH **QUESTION BANK** **(Regulation: R20)** **Department of Computer Science and Engineering**	**(Regulation :R20)**
	Sub. Code & Title — **R20CSE3203 Design and Analysis of Algorithms**	
	Academic Year: 2021-22 — **Year/Sem./Section** — **III – II /A,B,C,D**	
	Faculty Name & Designation — **Dr.S.Vijayarangam , Associate Professor/CSE**	

	UNIT IV		
	PART A		
	1 MARK QUESTIONS	**BT LEVEL**	**COURSE OUTCOME**
1	Define Backtracking .	1	CO5
2.	What do you mean by State Space Tree?	1	CO5
3.	Define n-Queens Problem.	1	CO5
4.	What is Hamiltonian cycle ?	1	CO5
5.	Define the term Branch and Bound Technique .	1	CO5
6.	Differentiate Feasible Solution and optimal solution .	4	CO5
7.	What is LIFO Search?	1	CO5
8	What is FIFO Search?	1	CO5
9	Define the following terms live node and E-node.	1	CO5
10	List the properties of LC-Search.	1	CO5
	PART B		
	10 MARKS QUESTIONS		
1	What is Backtracking? Explain in detail.	2	CO5
2	Explain Subset-sum Problem & Discuss the possible solution strategies using backtracking.	2	CO5
3	Write short notes on (a) Graph coloring (b) 8-Queens problem	2	CO5
4	Explain n-Queens problem with an algorithm.	2	CO5
5	Apply Backtracking technique to solve the following instance of the sum of sub sets problems w={5,7,10,12,15,18,20} & m=35	3	CO5
6	Explain graph coloring algorithm with an example	2	CO5
7	Explain Hamiltonian cycle with an example.	2	CO5
8	Using Backtracking enumerate how can you solve the following problems (a) 8-queens problem (8) (b) Hamiltonian Cycle problem	6	CO5
9	Find out solution for knapsack problem using LC and FIFO Branch and Bound	5	CO5
10	Compare Backtracking and Branch and Bound method.	4	CO5

	SRI INDU COLLEGE OF ENGG. & TECH **QUESTION BANK** **(Regulation: R20)** **Department of Computer Science and Engineering**	**(Regulation :R20)**
	Sub. Code & Title — **R20CSE3203 Design and Analysis of Algorithms**	
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	Faculty Name & Designation — **Dr.S.Vijayarangam , Associate Professor/CSE**	

	UNIT V		
	PART A		
	1 MARK QUESTIONS	**BT LEVEL**	**COURSE OUTCOME**
1	Define polynomial.	1	CO6
2.	Define NP.	1	CO6
3.	What is NP-hard problem?	1	CO6
4.	What is NP-complete problem?	1	CO6
5.	What is halting problem?	1	CO6
6.	Write the statement of Cook's theorem.	2	CO6
7.	What is Clique?	1	CO6
8	What is Deterministic algorithm?	1	CO6
9	What is Decision Problem ?	1	CO6
10	Compare P and NP.	4	CO6
	PART B		
	10 MARKS QUESTIONS		
1	Explain NP-hard and NP-Complete Classes.	2	CO6
2	Distinguish between Deterministic and non-deterministic algorithm.	4	CO6
3	What is meant by Halting problem explain with an example	1	CO6
4	Differentiate between NP-Complete and NP-Hard.	4	CO6
5	Explain maximum Clique.	2	CO6
6	Explain Optimization problem.	2	CO6
7	Briefly explain the concepts of the NP-Hard and NP-Complete?	2	CO6
8	Explain the P, NP, NP-Hard and NP- complete classes? Give relationship between them?	2	CO6
9	State and explain Cook's Theorem	2	CO6
10	Explain different types of NP problems.	2	CO6

BR-18 **D4**

Write Your Ht.No.

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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

III B.Tech. II Semester (REGULAR) End Examinations, Aug. / Sept. – 2021.

(R18CSE3203) DESIGN and ANALYSIS of ALGORITHMS

28/08/2021 **(For CSE)** **Day- 3 (FN)**

Duration: 3 Hrs **Maximum Marks: 70M**

Answer any FIVE questions from the following. ***(5Qx14M =70M)***

1. What is divide and conquer strategy? Explain the technique behind binary search algorithm with an example.

2. Explain Merge Sort algorithm with example.

3. Discuss about connected components and spanning trees with an example graph.

4. What are binary tree traversals? Explain non recursive binary tree traversal algorithm.

5. Explain Prim's Algorithm with an example graph.

6. How to generate associated matrices for a directed graph using All pairs shortest paths? Explain with an example.

7. Explain with an example how branch and bound technique is used to solve knapsack problem.

8. Discuss about Non deterministic Algorithms.

*****

BR-18 **Write Your Ht.No.** D4

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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

III B.Tech. II Semester (Suppl.) End Examinations, March – 2022.

(R18CSE3203) DESIGN AND ANALYSIS OF ALGORITHMS

07/03/2022 **(For CSE)** **Day- 3 (AN)**

Duration: 3 Hrs **Maximum Marks: 70M**

Blooms Taxonomy : (L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating and L6-Creating)

Course Outcomes : CO

Answer any FIVE questions from the following. ***(5Qx14M =70M)***

1. Determine the frequency counts for all statements in the following two algorithm segment? L3 CO1

   A)
   ```
   for i :=1to n do
       for j :=1to i do
           for k :=1toj do
               x :=x+1;
   ```

   B)
   ```
   i := 1;
   while (i<=n) do
       x :=x+ 1
   i :=i + 1
   ```

2. Explain in detail how the time complexity of Strassen's Matrix Multiplication is nearly $O(n^{2.81})$. L2 CO1

3. What are Sets? How are they represented? Explain various operations on Disjoint Sets. L1 CO2

4. Explain in detail about Connected components and Bi connected components. L2 CO2

5. Describe the Knapsack problem using greedy method. L3 CO3

6. What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm? L2 CO4

7. Briefly explain NP-hard and NP-completeness with example L4 CO5

P.T.O

8.	a)	List and define the Asymptotic Notations Big Oh, Omega, Theta and Little Oh?	L1	CO1	**(*4M*)**
	b)	Write a short note on BFS	L1	CO2	**(*4M*)**
	c)	Explain the general principle of Greedy method	L2	CO3	**(3*M*)**
	d)	Describe the 4-queens problem using backtracking.	L3	CO4	**(3*M*)**

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BR-18 **SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY** **D4**

III B.Tech. - II Semester - II Mid-Term Examinations, August – 2021.

(R18CSE3203) **Dt : 07-08-2021 – (Day - 2 FN)**

DESIGN AND ANALYSIS OF ALGORITHMS (For CSE)

Duration: 90Mins **Max Marks: 25M**

Section – A

Answer *All* the questions. **Marks: 5Qx1M = 5M**

1. What is dynamic programming?
2. Define Feasible Solution and optimal solution.
3. Define properties of LC-Search.
4. What is Clique?
5. What is Decision Problem?

Section – B

Answer any *FOUR* questions. **Marks: 4Qx5M = 20M**

6. Explain 0/1 knapsack problem with example.
7. Explain Matrix chain multiplication with an Example.
8. Apply Backtracking technique to solve the following instance of the sum of sub sets problems w={5,7,10,12,15,18,20} & m=35.
9. Explain General method of Branch and Bound.
10. Differentiate between NP-Complete and NP-Hard.
11. Explain the P, NP, NP-Hard and NP- complete classes. Give relationship between them.

BR-18 **SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY** **D4**

III B.Tech. - II Semester - II Mid-Term Examinations, August – 2021.

(R18CSE3203) **Dt : 07-08-2021 – (Day - 2 FN)**

DESIGN AND ANALYSIS OF ALGORITHMS (For CSE)

Duration: 90Mins **Max Marks: 25M**

Section – A

Answer *All* the questions. **Marks: 5Qx1M = 5M**

1. What is dynamic programming?
2. Define Feasible Solution and optimal solution.
3. Define properties of LC-Search.
4. What is Clique?
5. What is Decision Problem?

Section – B

Answer any *FOUR* questions. **Marks: 4Qx5M = 20M**

6. Explain 0/1 knapsack problem with example.
7. Explain Matrix chain multiplication with an Example.
8. Apply Backtracking technique to solve the following instance of the sum of sub sets problems w={5,7,10,12,15,18,20} & m=35.
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NAAC
NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

HANDOUT

III Year CSE - SemesterII

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

ACADEMIC YEAR 2022-23

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

HANDOUT- INDEX

S. No	Contents
1	Vision, Mission, PEOs, POs, PSOs & 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 (Previous3 Academic Year)
v)	Mid-1 & Mid-2 Questions (Previous 3 Academic Year)

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

B. TECH –COMPUTER SCIENCE AND ENGINEERING

INSTITUTION VISION

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

INSTITUTION MISSION

IM_1 Provide high quality academic programs, training activities and research facilities.

IM_2 Promote Continuous Industry-Institute interaction for employability, Entrepreneurship, leadership and research aptitude amongstakeholders.

IM_3 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 professionally.

DEPARTMENT MISSION

The Department has following Missions:

DM_1 To offer quality education in computing.

DM_2 To provide an environment that enable overall development of the stakeholders.

DM_3 To impart training on emerging on emerging technologies like Data Analytics,Artificial Intelligence and Internet of Things.

DM_4 To encourage participation of stake holders in research and development.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: **Higher Degrees & Professional Employment:** Graduates with ability to pursue career in core industries or higher studies in reputed institution.

PEO2: **Domain Knowledge:** Graduates with ability to apply professional knowledge/skills to design and develop product or process.

PEO3: **Engineering Career:** Graduates with excellence in Electronics and Communication Engineering along with effective inter-personnelskills.

PEO4: **Lifelong Learning:** Graduates equipped with skills in recent technologies and be receptive to attain professional competence through life-longlearning.

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-longlearning:**Recognizetheneedfor,andhavethepreparationandabilitytoengageinindependent and life-long learning in the broadest context of technological Change
Program Specific Outcomes	
PSO 1	Develop software projects using standard practices and suitable programming environment.
PSO 2	Identify, formulate and solve the real life problems faced in the society, industry and other areas by applying the skills of the programming languages, network and database learned.
PSO 3	To apply computer science knowledge in exploring and adopting latest technologies in various inter-disciplinary research activities.

COs MAPPING WITH POs & PSOs

SOFTWARE TESTING METHODOLOGIES (R18CSE3231)

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

C321.1.	**Summarize**a range of different software testing techniques and strategies for testing projects. (Understand)
C321.2.	**List** the characteristics of Dataflow and transaction flow testing methods. (Remember)
C321.3.	**Illustrate**appropriate software testing tools and techniques (Apply)
C321.4.	**Categorize** path products, expressions. (Analyze).
C321.5.	**Evaluate**various test cases for control flow and transaction flow graphs (Evaluate).
C321.6.	**Develop** and **apply** testing strategies for software applications (Create).

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C322.1	3	3	-	-	-	-	-	-	-	-	3	2	2	3	-
C322.2	3	3	-	2	-	-	-	-	-	-	2	2	1	3	-
C322.3	3	2	2	3	3	-	-	2	-	-	3	3	3	3	-
C322.4	3	3	-	-	-	-	-	-	-	-	2	2	1	2	-
C322.5	3	3	-	2	-	-	-	-	-	-	3	2	2	3	-
C322.6	3	3	3	2	3	-	-	-	-	-	3	3	3	3	-
	3	**2.8**	**2.5**	**2.2**	**3**			**2**			**2.7**	**2.3**	**2**	**2.8**	**-**

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

DEPARTMENT OF

DEPARTMENT CALENDAR – 2020-2021 (SECOND SEMESTER)

DAYS	MARCH '22	APRIL '22	MAY '22	JUNE '22	JULY '21	AUGUST '22
SUNDAY						
MONDAY	1					
TUESDAY	2			1 MID I EXAM		
WEDNESDAY	3			2 MID I EXAM		
THURSDAY	4	1		3 MID I EXAM	1	
FRIDAY	5	2 Good Friday		4 MID I EXAM	2	
SATURDAY	6	3	1 MAY DAY	5 MID I EXAM	3 Project Expo (II, III, IV)	
SUNDAY	7 HOLIDAY	4 HOLIDAY	2 HOLIDAY	6 HOLIDAY	4 HOLIDAY	1 HOLIDAY
MONDAY	8 Maharishi DayanandSaraswatiJ ayanti	5 BABU JAGJEEVAN RAM JYANTHI	3	7	5	2 MID II EXAM
TUESDAY	9	6	4	8	6	3 MID II EXAM
WEDNESDAY	10	7	5	9 SUBMISSION OF MID I MARKS	7	4 MID II EXAM
THURSDAY	11 Maha Shivaratri/Shivaratri	8	6	10	8	5 MID II EXAM
FRIDAY	12	9	7 Project Review	11	9	6 MID II EXAM
SATURDAY	13	10 Career Awareness (III Yr)	8 Project Review	12 Seminar (II Yr)	10 Design Contest (III Yr)	7 MID II EXAM
SUNDAY	14 HOLIDAY	11 HOLIDAY	9 HOLIDAY	13 HOLIDAY	11 HOLIDAY	8 HOLIDAY
MONDAY	15	12	10	14	12	9 Practical Exam (II, III) Project Evaluation (IV)
TUESDAY	16	13 UGADI	11	15	13	10 Practical Exam (II, III) Project Evaluation (IV)
WEDNESDAY	17	14 DR AMBEDKAR JYANTHI	12	16	14	11 SUBMISSION OF MID IIMARKS Practical Exam (II,III) Project Evaluation(IV)
THURSDAY	18	15	13	17	15	12 Practical Exam (II,III) Project Evaluation(IV)
FRIDAY	19	16	14 ID- UL FITR	18	16	13 Practical Exam (II, III) Project Evaluation (IV)
SATURDAY	20	17 Technical Seminar (IV Yr)	15 Technical Talk (III Yr)	19 Webinar (III Yr)	17 Workshop (IV Yr)	14 Practical Exam (II, III) Project Evaluation (IV)
SUNDAY	21 HOLIDAY	18 HOLIDAY	16 HOLIDAY	20 HOLIDAY	18 HOLIDAY	15 HOLIDAY
MONDAY	22 Commencement of Classes II,III,IV	19	17	21	19	16 COMMENCEMENT OF ENDSEMESTEREXAM (II,III, IV Year)
TUESDAY	23	20	18	22	20	17
WEDNESDAY	24	21 RAMA NAVAMI	19	23	21 BAKRID	18
THURSDAY	25	22	20	24	22	19 MUHARRAM
FRIDAY	26	23	21	25 Project Review	23	20 END SEMESTER EXAM
SATURDAY	27 Guest Lecture (II Yr)	24 Quiz Contest (II Yr)	22 Poster Presentation (II, IIIYr)	26 Project Review	24 Workshop (II Yr)	21
SUNDAY	28 HOLIDAY	25 HOLIDAY	23 HOLIDAY	27 HOLIDAY	25 HOLIDAY	22 HOLIDAY
MONDAY	29 Holi	26	24	28	26	23 END SEMESTER EXAM (II,III, IV Year)
TUESDAY	30	27	25	29	27	24
WEDNESDAY	31	28	26	30	28 Project Review	25
THURSDAY		29	27		29 Project Review	26
FRIDAY		30	28		30	27
SATURDAY			29 Workshop (IV Yr)		31	28
SUNDAY			30 HOLIDAY			29 HOLIDAY
MONDAY			31 MID I EXAM			30 JANMASHTAMI

SOFTWARE TESTING METHODOLOGIES

NBA & NAAC Accredited, Approved by AICTE and Permanently affiliated to JNTUH
Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

BR-20

Lr.No.SICET/AUTO/DAE/III B.Tech Academic Calendar/307/2022 **Dt: 03.08.2022**

Dr.G. SURESH,
Principal,

To,
All the HODs.

III B.TECH I SEM & II SEM ACADEMIC CALENDAR
ACADEMIC YEAR : 2022-23

Sir,

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for **B.Tech – 3rd Year** - For the academic year **2022-23** – Reg.

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The approved Academic Calendar for **B.Tech – 3rd Year (I & II Sem)** for the academic year **2022-23** is given below:

Academic Calendar for B.Tech – 3rd Year Students (2020 - 21 Batch), BR-20 Regulation.

I - Semester

Commencement of class work	**25.08.2022 (Thursday)**	
Instruction / Class Work. (Including CRT and Dussehra Holidays).	25.08.2022	28.12.2022 – 18 Weeks
Dussehra Holidays.	03.10.2022	06.10.2022 - 4 Days
I Mid Examinations for III B.Tech I Sem Students.	27.10.2022	29.10.2022 - 3 Days
II Mid Examinations for III B.Tech I Sem Students.	29.12.2022	31.12.2022 - 3 Days
Preparation Holidays & Practical Lab Examinations.	02.01.2023	07.01.2023 - 1 Week
Remedial Mid Test (RMT).	09.01.2023	11.01.2023 - 3 Days
III B.Tech I Semester End Examination.	16.01.2023	28.01.2023 - 2 Weeks
Commencement of class work of III B.Tech II Semester - 30.01.2023 (Monday)		

II - Semester

Commencement of class work	**30.01.2023 (Monday)**	
I Spell of Instructions.	30.01.2023	20.05.2023 - 16 Weeks
I Mid Examinations for III B.Tech II Sem Students.	27.03.2023	29.03.2023 - 3 Days
II Mid Examinations for III B.Tech II Sem Students.	23.05.2023	25.05.2023 - 3 Days
Preparation Holidays & Practical Lab Examinations.	26.05.2023	31.05.2023 - 1 Week
Remedial Mid Test (RMT).	01.06.2023	03.06.2023 - 3 Days
III B.Tech II Semester End Examination.	05.06.2023	17.06.2023 - 2 Weeks

ACE **CE** **DIRECTOR** **PRINCIPAL**

Copy to DAE.
Copy to all the Heads of the Depts.

CONTROLLER OF EXAMINATIONS
Sri Indu College of Engineering & Technology
(An Autonomous Institution under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R.Dist.-501510

DIRECTOR
(Academic Audit)
Sri Indu College of Engineering & Technology
Sheriguda, IBP, R.R. Dist-501510.

Sri Indu College of Engineering & Technology
(An Autonomous Institution under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R.Dist.-501510

Sri Indu College of Engineering &Technology

(An Autonomous Institution under UGC)
Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy (Dist) – 501 510

Department of Computer Science & Engineering

ROOM NO: 205
Class: III CSE –D (II SEM)

Time - Table

w.e.f: 02-02-2023

Time	9:40 – 10:40	10:40 – 11:40	11:40 – 12:40	12:40 To 1:20	1:20 – 2:15	2:15 – 3:10	3:10 – 4:00
Days	1	2	3		4	5	6
Monday	MAD LAB				CD	DAA	ML
Tuesday	MAD	ML	CD	L	CD LAB		
Wednesday	ML	CD	ITE	U	DAA	MAD	DAA
Thursday	DAA	ITE	DAA	N	ML	ITE	MAD
Friday	CD	MAD	ITE	C	ML LAB		
Saturday	MAD	ITE	CD	H	ITE	ML	DAA

SUBJECT CODE	SUBJECT NAME	FACULTY NAME
ML	Machine Learning	Mrs.G.Sirisha
CD	Compiler Design	Mrs.V.Kiranmai
DAA	Design and Analysis of Algorithms	Dr.S.Vijayarangam
MAD	Mobile Application Development	Ms.G.Swarnalatha
ITE	Information Technology Essentials	Mrs A.Ramya
ML LAB	Machine Learning Lab	Mrs.G.Sirisha/ Dr.S.Vijayarangam /Mr.K.Vijay Kumar
CD LAB	Compiler Design Lab	Mrs.V.Kiranmai / Mr.K.Naveen Chakravarthi/ Ms.D.Roopa
MAD LAB	Mobile Application Development Lab	Ms.G.Swarnalatha/ Mrs A.Ramya /Mr.K.Nagu

Class Co-Ordinator
Ms.G.Swarnalatha

DEAN

HOD

Sri Indu College of Engineering &Technology

(An Autonomous Institution under UGC)
Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy (Dist) – 501 510

Department of Computer Science & Engineering

ROOM NO: 204
Class: III CSE-C (II SEM)

Time - Table

w.e.f: 02-02-2023

Time	9:40 – 10:40	10:40 – 11:40	11:40 – 12:40	12:40 To 1:20	1:20 – 2:15	2:15 – 3:10	3:10 – 4:00
Days	1	2	3		4	5	6
Monday	CD LAB				ITE	ML	MAD
Tuesday	ML	CD	ITE	L	DAA	MAD	ITE
Wednesday	CD	MAD	DAA	U	ML LAB		
Thursday	MAD LAB			N	CD	DAA	ML
Friday	MAD	DAA	ML	C	ITE	CD	DAA
Saturday	ITE	DAA	ML	H	MAD	ITE	CD

SUBJECT CODE	SUBJECT NAME	FACULTY NAME
ML	Machine Learning	Mrs.G.Sirisha
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ITE	Information Technology Essentials	Mrs A.Ramya
ML LAB	Machine Learning Lab	Mrs.G.Sirisha/ Dr.S.Vijayarangam Mr.K.Vijay Kumar
CD LAB	Compiler Design Lab	Mrs.V.Kiranmai/Mr.K.Naveen Chakravarthi/ Ms.D.Roopa
MAD LAB	Mobile Application Development Lab	Ms.G.Swarnalatha/ Mrs A.Ramya / Mr.K.Nagu

Class Co-Ordinator
Mrs.V.Kiranmai

DEAN

HOD

COMPUTER SCIENCE & ENGINEERING

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC, New Delhi)

B.Tech. - III Year – II Semester

L	T	P	C
3	0	0	3

Professional Elective –III

(R20CSE3231) Software Testing Methodologies

Objectives:

To understand the software testing methodologies such as flow graphs and path testing, transaction flows testing, data flow testing domain testing and logic based testing.

UNIT I :

Introduction : Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomyof bugs

Flow graphs and Path testing : Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT II :

Transaction Flow Testing : Transaction flows, transaction flow testing techniques.

Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT III:

Domain Testing: Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT IV :

Paths, Path products and Regular expressions : Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing : Overview, decision tables, path expressions, kv charts, specifications.

UNIT V :

State, State Graphs and Transition testing : State graphs, good & bad state graphs, state testing, Testability tips.

Graph Matrices and Application : Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools (student should be given an exposure to a tool like JMeter or Win-runner).

TEXT BOOKS :

1. Software Testing techniques - Boris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCES :

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing, 3rd Edition, P.C. Jorgensen, Aurbach Publication (Dist by SPO)
3. Software Testing, n. Chauhan, Oxford University Press.
4. Introduction to Software Testing, P. Ammann & J. Offutt, Cambridge Univ. Press.
5. Effective methods of Software Testing, Perry, John Wiley 3rd Edition, 1999.
6. Software Testing Concepts and Tools, P. Nageswara Rao, dreamtech Press
7. Software Testing, M.G. Limye, TMH.
8. Software Testing, S. Desikan, G. Reamesh, Pearson
9. Foundations of Software Testing, D. Graham & Others, Cengage Learning.
10. Foundations of Software Testing, A.P. Madhur, Pearson.

Outcomes:

- Ability to apply the process of testing and various methodologies in testing for developedsoftware.
- Ability to write test cases for given softw3are to test it before delivery to the customer.

Unit/ Item No.	**Topic (s)**	Book Reference	Page (s) From	Page (s) To	Teaching Methodology	Proposed No. of Periods	Proposed Date of Handling	CO/RBT
I	**INTRODUCTION, FLOW GRAPHS AND PATH TESTING**					**15**		
1.1	Importance of the subject, Course objectives and Outcomes, Purpose of testing	T-1	1	3	PPT	01	22-3-21	CO-1, L2
1.2	Goals of testing, Phases in Tester's Mental life	T-1	3	6	PPT	01	22-3-21	CO-1,L2
1.3	Test Design,Testing is Not Everything, Pesticide Paradox and Complexity Barrier	T-1	7	9	PPT	01	22-3-21	CO-1,L2
1.4	Dichotomies	T-1	9	15	PPT	02	23-3-21	CO-1,L1
1.5	A Model for testing	T-1	15	20	PPT	01	23-3-21	CO-1,L2
1.6	Tests, Role of models	T-1	20	27	PPT	01	23-3-21	CO-1,L2
1.7	Consequences of bugs	T-1	27	28	PPT	01	06-4-21	CO-1,L2
1.8	How Bugs Affects us	T-1	28	33	PPT	01	06-4-21	CO-1,L2
1.9	Taxonomy of bugs	T-1	33	57	PPT	02	07-4-21	CO-1,L2
1.10	Basic concepts of path testing	T-1	59	90	PPT	02	07-4-21	CO-1,L2
1.11	Predicates, Path predicates and achievable paths	T-1	92	99	PPT	01	07-4-21	CO-1,L2
1.12	Path sensitizing, Path instrumentation	T-1	101	112	PPT	01	08-04-2023	CO-1,L2
1.13	Application of path testing	T-1	115	117	PPT	01		CO-1,L2

II	**TRANSACTION FLOW TESTING, DATAFLOW TESTING**					**12**		
2.1	Transaction flow testing	T-1,R-1	122	131	PPT	03	08-04-21	CO-2,L3
2.2	Transaction flow testing Techniques	T-1,R-1	133	139	PPT	03	08-04-21	CO-2,L3
2.3	Dataflow testing: Basics of dataflow testing	T-1,R-1	145	157	PPT	03	08-04-21	CO-2,L3
2.4	Strategies in dataflow Testing	T-1,R-1	161	167	PPT	02	12-04-21	CO-2,L3
2.5	Applications of dataflow Testing	T-1	168	171	PPT	01		CO-2
	Review	**Signature of the HOD/Coordinator**						
	UNIT- III							
III	**DOMAIN TESTING**					**12**		
3.1	Domains and paths	T-1,R-1	173	179	PPT	03	20-04-21	CO-3,L4
3.2	Nice & ugly domains	T-1	182	188	PPT	02	20-04-21	CO-3,L4
3.3	Domain testing	T-1	192	201	PPT	02	26-04-21	CO-3,L4
3.4	Domains and interfaces testing	T-1,R-1	202	206	PPT	02	26-04-21	CO-3,L4
3.5	Domains and testability	T-1,R-1	207	210	PPT	02	27-04-21	CO-3,L4
3.6	Revision ofdomain Testing	T-1			PPT	01	27-04-21	CO-3,L4

	Review	**Signature of the HOD/Coordinator**						
	UNIT-IV							
IV	**PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS,GRAPH MATRICES AND APPLICATION**					**14**		
4.1	Path products & path Expressions	T-1,R-1	244	250	PPT	02	10-05-21	CO-4,L2
4.2	Reduction procedure	T-1,R-1	251	256	PPT	02	10-05-21	CO-4,L2
4.3	Applications	T-1,R-2	257	277	PPT	01	11-05-21	CO-4,L2

4.4	Regular expressions	T-1,R-2	278	280	PPT	01	11-05-21	CO-4,L2
4.5	Flow anomaly detection	T-1	281	282	PPT	01	12-05-21	CO-4,L2
4.6	Logic based testingOverview	T-1	320	322	PPT	01	12-05-21	CO-4,L2
4.7	Decision tables	T-1	322	329	PPT	02	13-05-21	CO-4,L2
4.8	Path expressions	T-1	332	341	PPT	02	13-05-21	CO-4,L2
4.9	KV charts	T-1	343	352	PPT	01	17-05-21	CO-4,L2
4.10	Specifications	T-1	352	357	PPT	01	17-05-21	CO-4,L2
	UNIT-V							
V	**STATES,STATE GRAPHS,AND TRANSITION TESTING,GRAPH MATRICES AND APPLICATIONS**					12		
5.1	State graphs	T-1	363	369	PPT	01	18-05-21	CO-5,L2
5.2	Good & Bad state graphs	T-1	373	386	PPT	01	18-05-21	CO-5,L2
5.3	State testing	T-1	387	390	PPT	2		CO-5,
5.4	Testability tips	T-1	391	394	PPT	1		CO-5,
5.5	Graph Matrices overview	T-1	397	398	PPT	1		CO-5,
5.6	Matrix of graph, relations, power of a matrix	T-1	399	414	PPT	2		CO-5,
5.7	Node reduction algorithm	T-1	415	420	PPT	1		CO-5,
5.8	Building tools	T-1	421	426	PPT	1		CO-5,
	Review	**Signature of the HOD/Coordinator**						

LIST OF TEXT BOOKS AND REFERENCES

TEXT BOOKS:

T1. Software Testing techniques – Boris Beizer, Dreamtech, secondedition.

T2. Software Testing Tools – Dr.K.V.K.K.Prasad,Dreamtech.

REFERENCE BOOKS:

R1. The craft of software testing – Brian Marick, PearsonEducation.

R2. Software Testing Techniques –SPD(Oreille)

R3. Software Testing in the Real World – Edward Kit,Pearson.

R4. Effective methods of Software Testing, Perry, JohnWiley.

R5. Art of Software Testing – Meyers, JohnWiley.

Web links

W1. https://www.guru99.com/testing-methodology.html

W4. https://www.youtube.com/watch?v=aFyK1zLFmXQ

W5. https://www.youtube.com/watch?v=2xCMemD3Jyk&t=20s

W6. http://elearningmodules4engg.blogspot.com/2015/06/k-v-charts-unit-6.html

Sri Indu College of Engineering & Technology :: Sheriguda (V), R.R.Dist

Department of Computer science and engineering

FACULTY TIME TABLE

Time	9:40 -10:40	10:40-11:20	11:20-12:10	12:10 – 1:00	1:30 - 2:20	2:20 – 3:10	3:10 - 4:00
Days	1	2	3		4	5	6
Monday	STM LAB(III-D)						STM(III-C)
Tuesday	STM(III-D)					STM(III-C)	
Wednesday		STM(III-D)				STM(III-C)	
Thursday	STM LAB(C)						STM(III-D)
Friday	STM(III-C)	STM(III-D)					
Saturday	STM(III - C)					STM(III - D)	

Name of the Faculty:G.SWARNALATHA **AY:2022-2023**

FACULTY SIGNATURE **HOD (CSE)**

S.No	Assignment Questions	Course Outcome	Books To be Referred	Date Of Announcement	Date Of Submission
1	Explian white-box testing and black box testing?	CO1			
2	What are data-flow anomalies? How data flow testing can explore them?	CO2			
3	Discuss in detail about testability of Domains?	CO3			

QUESTION BANK WITH BLOOMS TAXONOMY LEVEL (BTL)

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

UNIT-1 INTRODUCTION, FLOW GRAPHS AND PATH TESTING			
	1 MARKS QUESTIONS	**BT Level**	**Course Outcome**
1.	Write in detail about Software Testing?(Applying)	1	CO1
2.	What are the phases of Testing?(Analyzing)	1	CO1
3.	Mention the Dichotomies?(Remembering)	1	CO1
4..	Define a Bug?(Remembering)	1	CO1
5.	Define Unit Testing? (Remembering)	2	CO1
6.	Delineate Component Testing? (Remembering)	2	CO1
7.	Delineate Integration Testing? (Remembering)	3	CO1
8	What are different kinds of loops?(Analyzing)	4	CO1
9	Define path sensitizing? (Remembering)	4	CO1
10	Define Control flow graphs? (Remembering)	5	CO1
	10 MARKS QUESTIONS		
1.	Elucidate path instrumentation and write applications of path testing? (Understanding)	2	CO1
2.	Explicate white-box testing and black box testing? (Understanding)	2	CO1
3.	Explicate Testing versus Debugging? (Understanding)	2	CO1
4.	Explicate different types of Testing? (Understanding)	2	CO1
5.	Discuss about requirements, features and functionality bugs? (Understanding)	2	CO1
6.	Write a short note on Data bugs and coding bugs ?(Applying)	2	CO1
7.	Explicate concatenated loops with an example? (Understanding)	4	CO1
8	Elucidate statement testing (C1) and branch testing (C2) with an example? (Understanding)	5	CO1
9	State and explicate various path selection rules?(Remembering)	5	CO1

10	State and explicate various kinds of predicate blindness with examples? (Remembering)	5	CO1
Unit -II : TRANSACTION FLOW TESTING, DATAFLOW TESTING			
1 MARK QUESTIONS			
1.	Define transaction flow? (Remembering)	1	CO2
2.	Define data flow testing? (Remembering)	1	CO2
3.	Define debugging? (Remembering)	1	CO2
4.	Define transaction flow sensitization? (Remembering)	1	CO2
5.	Define anomaly? (Remembering)	1	CO2
6.	Define static anomaly detection? (Remembering)	1	CO2
7.	Define dynamic anomaly detection? (Remembering)	3	CO2
8	Explicate transaction flow junction?(Understanding)	4	CO2
9	Define ADUP? (Remembering)	4	CO2
10	Define APU & ACU strategies? (Remembering)		CO2
10 MARKS QUESTIONS			
1	Distinguish Control Flow and Transaction flow?(Analyzing)	2	CO2
2.	Illustrate transaction flow testing? Discuss its significance? (Applying)	2	CO2
3.	Discuss in detail data - flow testing strategies.(Understanding)	2	CO2
4.	Write application of data flow testing? (Applying)	2	CO2
5.	What are data-flow anomalies? How data flow testing can explore them? (Analyzing)	2	CO2
6.	Explain in detail about Data flow anomaly state graph?(Understanding)	2	CO2
7.	Explicate the terms Dicing, Data-flow and Debugging? (Understanding)	3	CO2
8	Illustrate data flow model? Discuss various components of it? (Applying)	4	CO2
9	Compare data flow and transaction flow testing strategies? (Analyzing)	4	CO2
10	Explicate definition clear path, loop free path, simple and du path segments? (Understanding)	6	CO2
Unit – III : TRANSACTION FLOW TESTING, DATAFLOW TESTING			
1 MARK QUESTIONS			

1.	Define domain testing? (Remembering)	1	CO3
2.	Differentiate open & closed domains? (Analyzing)	1	CO3
3	What are ugly domains? (Analyzing)	1	CO3
4.	Define domain dimensionality? (Remembering)	2	CO3
5	Define linear predicates? (Remembering)	2	CO3
6.	Define nice domains? (Remembering)	2	CO3
7	Draw the interior, boundary & extreme point graphs? (Creating)	3	CO3
8.	List the limitations of domain testing?(Remembering)	3	CO3
9.	Define domain, range? (Remembering)	4	CO3
10.	Define linearizing transformations? (Remembering)	5	CO3
	10 MARKS QUESTIONS		
1.	Discuss in detail about testability of Domains? (Understanding)	1	CO3
2	Elucidate Domain Dimensionality? (Understanding)	2	CO3
3.	Elucidate nice - domain? Give an example for nice two - dimensional domain? (Understanding)	2	CO3
4	Discuss i. Linear domain boundaries ii.Non linear domain boundariesiii.Complete domain boundariesiv.Incomplete domain boundaries (Understanding)	2	CO3
5.	Explicate various properties related to Ugly-domains? (Understanding)	2	CO3
6	State and explicate closure compatibility and span compatibility?(Understanding)	2	CO3
7.	Elucidate domain testing? Discuss the various applications of domain testing? (Understand)	3	CO3
8.	With a neat diagram, explicate the schematic representation of domain testing? (Creating)	4	CO3

9.	Explicate how one-dimensional domains are tested? (Understanding)	2	CO3
10.	Discuss in detail the domains and interface testing? (Understanding)	2	CO3

Unit-IV: PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS, GRAPH MATRICES AND APPLICATION			
1 MARK QUESTIONS			
1.	Define Path expression? (Remembering)	1	CO4
2.	Define Regular Expression? (Remembering)	1	CO4
3.	What is path Sum? (Analyzing)	1	CO4
4.	Define path product? (Remembering)	1	CO4
5.	Differentiate structured flow graph & un- structured flow graph? (Analyzing)	1	CO4
6.	Define decision tables? (Remembering)	2	CO4
7.	Set down the concept of KV chart? (Applying)	3	CO4
8	Define condition stub? (Remembering)	3	CO4
9	Define action stub? (Remembering)	4	CO4
10	Draw the k-map for 3 variable functions? (Creating)	5	CO4
10 MARK QUESTIONS			
1.	Write Short Notes on i. Distributive Laws ii. Absorption Ruless iii. Loops **iv.** Identity elements (Applying)	3	CO4
2.	Example Huang's theorem with example? (Analyzing)	1	CO4

3.	Explicate Regular Expressions and Flow Anomaly detection? (Understanding)	2	CO4
4.	Discuss Path Sums and Path Product? (Understanding)	2	CO4
5.	Discuss in detail about applications of path expressions? (Understanding)	2	CO4
6.	Discuss mean processing time and push/pop node reduction methods? (Understanding)	2	CO4
7.	Flow graphs are abstract representations of programs. Justify? (Creating, evaluating)	3	CO4
8	What are decision tables? Illustrate the applications of decision tables. How is a decision table useful in testing? (Applying)	3	CO4
9	Write in detail about logical based testing? (Understanding)	2	CO4
10	Reduce the following functions using K-Maps (Evaluating) **i. F(A,B,C,D) = P(4,5,6,7,8,12,13)+d(1,15)**	4	CO4
Unit-V: STATES,STATE GRAPHS,AND TRANSITION TESTING,GRAPH MATRICES AND APPLICATIONS			
1 **MARK QUESTIONS**			
1.	Define Finite State Machine? (Remembering)	1	CO5
2.	Define State Graph? (Remembering)	2	CO5
3.	Define Dead States? (Remembering)	1	CO5
4.	Define Equivalence State? (Remembering)	1	CO5
5.	What is State transition table? (Analyzing)	1	CO5
6.	Define Graph? (Remembering)	1	CO5
7.	Define Reflexive Relations? (Remembering)	3	CO5
8	Define directed & undirected Graph? (Remembering)	4	CO5
9	Define loop reduction? (Remembering)	4	CO5
10	Define linked list representation? (Remembering)	5	CO5
10 MARKS QUESTIONS			

1.	1) Write short notes on a. Transition Bugs b. Dead States c. State Bugs d. Encoding Bugs (Understanding)	2	CO5
2.	What are the principles of state testing? Discuss advantages and disadvantages? (Analyzing)	2	CO5
3.	Write the design guidelines for building finite state machine into code? (Applying)	2	CO5
4	Discuss about good and bad state graphs? (Understanding)	2	CO5
5.	What are the software implementation issues in state testing? (Analyzing)	2	CO5
6.	Discuss node reduction algorithm? (Understanding)	2	CO5
7.	What are the principles of state testing? Discuss advantages and disadvantages? (Analyzing)	4	CO5
8	Write the design guidelines for building finite state machine into code? (Applying)	4	CO5
9	Discuss about good and bad state graphs? (Understanding)	4	CO5
10	What are the software implementation issues in state testing? (Analyzing)	5	CO5

BR-16 **D4**

Subject Code: R16CSE1121

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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

III B.Tech - II Semester –End Examinations (Regular) May - 2019

SOFTWARE TESTING METHODOLOGIES

(Common to CSE, IT)

Duration: 3 Hrs **04.05.2019** **Max Marks: 70M**

Section – A

Answer *All* the following questions **Marks: 5Qx4M = 20M**

1. Compare among testing and debugging.
2. Mention the applications of data flow testing.
3. Describe about nice and ugly domains.
4. What is data flow anomaly problem?
5. What are the principles of state testing?

Section – B

Answer any *FIVE* questions choosing at least one from each Unit

Marks: 5Qx10M = 50M

UNIT-I

6. Discuss about the taxonomy of bugs in detail.

(OR)

7. Discuss about path sensitizing and path instrumentation.

UNIT-II

8. Write short notes on the following:
   i) Transaction Flow Graphs ii) Data flow testing.

(OR)

9. Discuss about various Transaction flow testing techniques.

UNIT-III

10. Explain about domain bugs and how to test them.

(OR)

11. Write how to perform interface testing.

UNIT-IV

12. Explain about KV charts in detail.

(OR)

13. Discuss about path products and path expressions.

UNIT-V

14. Explain about the Partitioning Algorithm.

(OR)

15. Discuss about the Node Reduction Algorithm.

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BR-16SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY D4

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

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

(R16CSE1121) SOFTWARE TESTING METHODOLOGIES

(Common to CSE, IT)

Duration: 90Mins **Date: 15.04.2019 AN** **Max Marks: 25M**

Section – A

Answer *All* the questions **Marks: 5Qx1M = 5M**

1. Define linear predicates.
2. Define Path expression.
3. What is path Sum?
4. Demonstrate Dead States.
5. Describe loop reduction.

Section – B

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

6. Explicate how one-dimensional domains are tested.
7. Differentiate in detail the domains and interface testing.
8. Example Huang's theorem with example.
9. Discuss Path Sums and Path Product.
10. Discuss about good and bad state graphs.
11. Explicate various types of relations related to matrix.

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BR-14 **D4**

Subject Code: R14CSE1121

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

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

III B.Tech- II Semester –End Examinations (Regular/Suppl.) May - 2018

SOFTWARE TESTING METHODOLOGIES

(Common to CSE, IT)

Duration: 3 Hrs **Max Marks: 70M**

Section – A

Answer *All* the following questions **Marks: 5Qx4M = 20M**

1. Explain the testing process.
2. Differentiate between fault and failure.
3. What are the different testing features?
4. Define directed and Undirected graphs with example.
5. Explain about testing categorization.

Section – B

Answer any *FIVE* questions choosing at least one from each Unit

Marks: 5Qx10M = 50M

UNIT - I

6. a) Why testing is important in software development?
   b) Mention the purpose of testing.

(OR)

7. a) Mention the applications of path testing
   b) Explain the basic concepts of path testing.

UNIT - II

8. a) What is meant by transaction flow. How they are different from data flow diagram.
   b) Explain the transaction flow testing techniques.

(OR)

9. a) What are the different strategies in data flow testing.
   b) Explain Object Class testing with examples.

UNIT - III

10. a) What are domains and Paths. Discuss about Domain testing.
    b) Describe about Domain and Interface Testing.

(OR)

11. a) What are the objectives of Integration Testing.
    b) What is meant by testability? Explain various properties of testability.

UNIT - IV

12. a) Differentiate between path product and path expression.
    b) Discuss about Logic based testing.

(OR)

13. Explain the Huang's theorem withexample.

UNIT - V

14. a) What is State Graphs. Discuss about its features.
    b) Differentiate between Good and Bad State Graphs.

(OR)

15. What is Node Reduction Algorithim.

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BR-14 **SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY** **D4**

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

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

(R14CSE1121) SOFTWARE TESTING METHODOLOGIES

(Common to CSE, IT)

Duration: 90Mins **Date: 09.04.2018 AN** **Max Marks: 25M**

Section – A

Answer *All* the questions **Marks: 1Mx5Q = 5M**

1. Define nice domains.
2. Define condition stub.
3. Define action stub.
4. Define Finite State Machine.
5. Define State Graph.

Section – B

Answer any *FOUR* questions **Marks: 5Mx4Q = 20M**

6. Elucidate domain testing. Discuss the various applications of domain testing.
7. With a neat diagram, explicate the schematic representation of domain testing.
8. Discuss Path Sums and Path Product.
9. Explicate about the ambiguities and contradictions in specifications.
10. Discuss node reduction algorithm.
11. Write about loops in matrix representation.

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BR-14 **D4**

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III B.Tech - II Semester –End Examinations (Regular) April/May - 2017

SOFTWARE TESTING METHODOLOGIES

(Common to CSE, IT)

Duration: 3 Hrs **Max Marks: 70M**

Section – A

Answer *All* the following questions **Marks: 5x4 = 20M**

1. Explain the Traversal marker form for path instrumentation.
2. Write a short note on transaction flows. Write its complications.
3. What is the purpose of domain testing? Give its schematic representation.
4. What is the significance of decision tables in logic based testing? Write its applications.
5. State and explain principles of state testing. What is the impact of Bugs in State Testing?

Section – B

Answer any *FIVE* of the following questions **Marks: 5x10 = 50M**

UNIT-I

6.a) Explain Heuristic procedures for sensitizing paths.
b) What is predicate coverage? Explain with example.

(OR)

7. a) State and explain various dichotomies in software testing.
b) Draw and explain model of testing. Is complete testing possible? Discuss.

UNIT-II

8. a) The transaction flows are often ill structured. Discuss its reasons.
b) Illustrate the applications of data flow testing.

(OR)

9. a) What is meant by transaction flow testing? Discuss its significance.
b) Explain the application tools and effectiveness of data flow testing.

UNIT-III

10. a) What are domain bugs? Illustrate how to test them.
b) State and explain with suitable examples various two-dimensional domain bugs.

(OR)

11. a) What is meant by domain dimensionality? Explain.
b) State and explain various restrictions at domain testing processes.

UNIT-IV

12. State Huang's theorem and explain its implementation. Also explain its generalizations and limitations.

(OR)

13. What are the decision tables? Illustrate about decision table processors and Kv-charts.

UNIT-V

14. a) Discuss briefly with an example about good state graphs and bad state graphs.
    b) Explain about the node reduction algorithm.

(OR)

15. Discuss briefly about the power of a matrix. Write relative merits and demerits of different Graph Matrix representations.

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