COURSE FILE

Artificial Intelligence Deep Learning (BTETPE703B)

Subject Teacher Ms. SNEHAL SUNIL GAIKWAD

FINAL YEAR (Semester VII)



Electronics and Telecommunication Engineering

Dr. Babasaheb Ambedkar Technological University, Lonere 2022-2023

Name of the	BTETPE703B: Artificial Intelligence Deep Learning
Course	
Course Content	UNIT 1: Introduction: What Is AI? Thinking humanly: The cognitive modeling approach. Thinking rationally: The "laws of thought" approach, Acting rationally: The rational agent approach. The Foundations of Artificial Intelligence, Mathematics, Economics, Neuroscience, Computer engineering, The History of Artificial Intelligence. AI becomes an industry (1980 present). Agents and Environments, Good Behaviour: The Concept of Rationality. The Nature of Environments. The Structure of Agents.
	UNIT – 2: Search Techniques: Problem-Solving Agents, Well-defined problems and solutions, Formulating problems, Real- world problems. Uninformed Search Strategies, Breadth-first search, Uniform-cost search, Depth-first search, Depth-limited search, Iterative deepening depth-first search, Bidirectional search, Informed (Heuristic) Search Strategies, Greedy best-first search, A* search: Minimizing the total estimated solution cost, Heuristic Functions. The effect of heuristic accuracy on performance. Beyon Classical Search, Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces.
	UNIT – 3: Game Playing: Games, Optimal Decisions in Games, The minimax algorithm, Optimal decisions in multiplayer games, Alpha Beta Pruning, Move ordering, Imperfect Real-Time Decisions, Cutting off search, Forward pruning, Stochastic Games, Evaluation functions for games of chance, Partially Observable Games, Krieg spiel: Partially observable chess, Card games, State-of-the-Art Game Programs, Alternative Approaches.
	UNIT – 4: Logic and inference: Defining Constraint Satisfaction Problems, Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems, Knowledge-Based Agents, The Wumpus World, Logic , Propositional Logic: A Very Simple Logic, Propositional Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic. Forward Chaining, Backward Chaining, Definition of Classical Planning. Algorithms for Planning as State-Space Search, Planning Graphs.
	UNIT – 5: Learning: Forms of Learning, Supervised Learning, Learning Decision Trees, Evaluating and Choosing the Best Hypothesis, Model selection: Complexity versus goodness of fit, From error rates to loss, Regularization, The Theory of Learning, Regression and Classification with Linear Models, Artificial Neural Networks, Nonparametric Models, Ensemble Learning, Online

	Learning, Practical Machine Learning, A Logical Formulation of Learning. Knowledge in Learning. Explanation-Based Learning, Learning Using Relevance Information. Inductive Logic Programming. Statistical Learning. Learning with Complete Data. Learning with Hidden Variables: The EM Algorithm.
Text/	1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern
Reference	Approach. III Edition
Books	2. E. Rich, K. Knight & S. B. Nair - Artificial Intelligence, 3/e, McGraw Hill.
	3. Dan W. Patterson, Introduction to Artificial Intelligence and Expert
	Systems, Prentice Hal of India.
	4. G. Luger, "Artificial Intelligence: Structures and Strategies for complex
	problem Solving", Fourth Edition, Pearson Education, 2002.
	5. N.P. Padhy "Artificial Intelligence and Intelligent Systems", Oxford
	UniversityPress- 2015.

Dr. Babasaheb Ambedkar Technological University, Lonere

Department of Electronics and Telecommunication Engineering

TEACHING PLAN 2022-2023(Odd Semester)

BTETPE703B: Artificial Intelligence Deep Learning

Marking Scheme: CA1- 10 Marks CA1- 10 Marks Mid Semester-20 Marks

Semester Examination- 60 marks (Conducted by Examination Section)

Syllabus:

Unit	Chapter	Lecture	Topics
No.	Name	No.	
Ι	Introduction	1	Introduction to AI and deep learning
		2	What Is AI? Thinking humanly: The cognitive modeling approach. Thinking rationally: The "laws of thought" approach,
		3	Acting rationally: The rational agent approach. The Foundations of Artificial Intelligence, Mathematics, Economics, Neuroscience, Computer engineering,
		4	The History of Artificial Intelligence. AI becomes an industry (1980 present).
		5	Agents and Environments, Good Behaviour: The Concept of Rationality.
		6,7	The Nature of Environments. The Structure of Agents.
II	Search	8	Problem-Solving Agents, Well-defined problems and solutions,
	Techniques	9	Formulating problems, Real- world problems.
		9 10, 11	Uninformed Search Strategies, Breadth-first search, Examples
		10, 11	Uniform-cost search, Depth-first search, Examples Depth-limited search, Iterative deepening depth-first search,
		12, 15	Examples
		14, 15	Bidirectional search, Informed (Heuristic) Search Strategies, Greedy best-first search, Examples
		16, 17	A* search: Minimizing the total estimated solution cost, Heuristic Functions. Examples
		18, 19	The effect of heuristic accuracy on performance. Beyon Classical Search, Examples
		20, 21	Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Examples
III	Game Playing	22, 23	Games, Optimal Decisions in Games, The minimax algorithm, Optimal decisions in multiplayer games,
		24, 25	Alpha Beta Pruning, Move ordering, Imperfect Real-Time Decisions, Cutting off search,
		26	Forward pruning, Stochastic Games, Evaluation functions for games of chance,
		27, 28	Partially Observable Games, Krieg spiel: Partially observable chess, Card games, State-of-the-Art Game Programs, Alternative Approaches.

		29	Problems solving
IV	Logic and inference	30	Defining Constraint Satisfaction Problems, Constraint Propagation: Inference in CSPs,
		31, 32	Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems,
		33, 34	Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic: A Very Simple Logic, Propositional Theorem Proving,
		35	Effective Propositional Model Checking, Agents Based on Propositional Logic. Forward Chaining, Backward Chaining,
		36, 37	Definition of Classical Planning. Algorithms for Planning as State-Space Search, Planning Graphs.
		38, 39	Problems solving
VI	Learning	40, 41	Forms of Learning, Supervised Learning, Learning Decision Trees, Evaluating and Choosing the Best Hypothesis,
		42	Model selection: Complexity versus goodness of fit, From error rates to loss, Regularization,
		43	The Theory of Learning, Regression and Classification with Linear Models,
		44, 45	Artificial Neural Networks, Nonparametric Models, Ensemble Learning, Online Learning,
		46	Practical Machine Learning, A Logical Formulation of Learning. Knowledge in Learning.
		47	Explanation-Based Learning, Learning Using Relevance Information. Inductive Logic Programming
		48, 49	Statistical Learning. Learning with Complete Data. Learning with Hidden Variables: The EM Algorithm
		50	Problem solving and discussion

Reference /Text books:

- 1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach. III Edition
- 2. E. Rich, K. Knight & S. B. Nair Artificial Intelligence, 3/e, McGraw Hill.
- 3. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, Prentice Hal of India.
- 4. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem Solving", Fourth Edition, Pearson Education, 2002.
- 5. N.P. Padhy "Artificial Intelligence and Intelligent Systems", Oxford University Press- 2015.

Course Coordinator: Snehal Sunil Gaikwad.

Program Outcomes:

PO1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	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 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	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	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	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	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	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	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	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Outcomes:

Upon successful completion of the course, the students will be able to

- CO1: Solve basic AI based problems.
- CO2: Define the concept of Artificial Intelligence.
- CO3: Apply AI techniques to real-world problems to develop intelligent systems.

CO4: Select appropriately from a range of techniques when implementing intelligent systems.

Course outcomes	and Programme	outcomes	manning table
<u>Course ourcomes</u>	and i i ogi ammo	outcomes	mapping table

Course		Programme Outcomes												
Outcomes	PO1	PO2	PO3	PO4	PO5									
CO1	medium	high	high	high	medium									
CO2	low		high	high	-									
CO3	-	-	high	-	high									
CO4	-	high	-	-	high									

Master Timetable:

Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE. Department of Electronics & Telecommunication Engineering

W.E.F. March 2022

III-A				12:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00
		EM+III[104]	DE(NSJ)[104]			EDC(JSK)[106]		DE[A](KSK)	/EDC[B](RKB)
111-8		DE(PSB)[106]		EM-III[104]	L	EMI(UPP)[104]		EDC(PSB)[104]	
V-A		DSP(SLN)[101]	EMFT(SBD)[101] CSE(RKB)[101]		U	DSP[A](PPI)/AC	OMM(B)(TUM)		
V-B	DSP[D](SSG)/A	COMM[E](AAJ)	ACOMM(AAJ)[106]	DSP(SSG)[106]	N	DSD(KSK)[101]		EMFT(AAJ)[101]	
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VII-B			Mill (All OFF) / POC(All Jak) / Wan(All Jan)						ESC(MRM)[106]
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111-8		EMI(UPP)[104]		EM-III[104]	L	DE(PSB)[101]		DE[E](KSK)	/EDC[F](AAJ)
V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]	U		DSD(KSK)[101]	DSP[C](AAP)/A	COMM(A)[TUM]
V-B	DSP[F](PPI)/ACC	DMM(D)[MRM]	ACOMM(AAJ)[106]	DSD(KSK)[106]		EMFT(AAJ)[106]	DSP(SSG)[106]		
VII-A	MTT(SVK)[101],				Ĥ				AIDL(SSG)[101],
VII-B	WSN(BRI)[106], FOC(JSK)[104]	DCE(AAP)[104]	MTT[B](SM)/FOC[B](JSK)/WSN[B](RKB)		MECH[/	A](PPM)	DC(PPI)[106]	VLSI(NSJ)[106]
III-A	DE[B](PPI)/S	DC[C](RKB)	DE(NSJ)[104]	J)[104] EDC(JSK)[104]				EMI(UPP)[104]	
111-8		EDC(PSB)[106]		EM-III[106]	L	EMI(UPP)[104]		DE[G](PPI)	/EDC[H](AAJ)
V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]	U	DSP[B](AAP)/AC	OMM[C](MRM)		
V-B	DSP[E](SSG)/AC	COMM[F](KSK)	ACOMM(AAJ)[106]			CSE(RKB)[101]		DSD(KSK)[101]	DSP(SSG)[104]
VII-A	MTT(SVK)[101],				Ĥ		AIDL(SSG)[101].	FM(AAP)[106]	AICD(PPM)[101],
VII-B	WSN(BRI)[106], FOC(JSK)[104]	DCE(AAP)[104]	AIDL(A)(SSG)/VLSI(A	(PSB)/DCE[A](AAP)		DC(PPI)[106]	VLSI(NSJ)[106]		ESC(MRM)[106]
III-A			DE(NSJ)[104]	DE(NSJ)[104]		DE[D](UPP)/EDC[A](JSK)			
111-8	DE[F](TUM)/	EDC[G](JSK)		EM-III[104]	L		EDC(PSB)[106]	DE(PSB)[106]	
V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]			DSD(KSK)[101]	CSE(RKB)[101]	
V-B			ACOMM(AAJ)[106]		C	EMFT(AAJ)[104]	CSE(RKB)[104]	DSD(KSK)[104]	DSP(SSG)[104]
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V-A			DSD(KSK)[101]			ACOMM(MRM)[101]	DSD(KSK)[101]	CSE(RKB)[101]	CSE(RKB)[101]
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DCE(AAP)[104] VII-A MSN(BRII]06], POC(JSK)[104] DCE(AAP)[104] VII-A MECH(PPM)[101] DCE(PII][106] VII-A MECH(PPM)[101] EM-III[104] III-A DE[H](UPP)/EDC[E](PSB) V-A VII-A DE[H](UPP)/EDC[E](PSB) VII-A VII-A DC(PPI)[106] VIII-A</th> <th>VII-A MTT(SVK)[101], WSNBRIJ[106], FOC/JSK)[104] MTT[A](UPP)/FOC/J III-A DE(C)(TUM)/EDC[D](PSB) DE(NSJ)[104] III-B EIMI(UPP)[104] V-A DSP[F](PPI)/ACOMM(D)[MRM] ACOMM(AAJ][106] V-B DSP[F](PPI)/ACOMM(D)[MRM] ACOMM(AAJ][106] VII-B FOC(JSK)[104] MTT[B](SM)/FOC[B VII-B FOC(JSK)[104] MTT[B](SM)/FOC[B VII-B FOC(JSK)[104] MTT[B](SM)/FOC[B VII-B FOC(JSK)[104] MTT[B](SM)/FOC[B VII-B FOC(JSK)[104] DE(NSJ)[104] III-A DE[B](PPI)/EDC[C](RKB) DE(NSJ)[104] III-A DE[B](PPI)/EDC[C](RKB) DE(NSJ)[104] III-A DE[B](PPI)/EDC[C](RKB) DE(NSJ)[101] VI-B DSP[E](SSG/ACOMM[F](KSK) ACOMM(AAJ][106] VI-A WSNBRIJ[10E], FOC(JSK)[104] DE(NSJ)[104] III-A DE[F](TUM)/EDC[G](JSK) AIDL[A](SSG)/VLSI[4 VI-B DE[F](TUM)/EDC[G](JSK) ACOMM(AAJ][106] VI-A DSP[SLN][101] EMFT(SBD][101] VI-B</th> <th>VII-A MTT[SVK][101], VII-B MTT[A][UPP]/F0C[A][JSK]/WSN[A][SM] VII-B F0C(JSK)[104] MTT[A][UPP]/F0C[A][JSK]/WSN[A][SM] III-B EMI[UPP][104] EMI[UPP]/E0C[A][JSK]/WSN[A][SM] VII-A DSP[F][PPI]/ACOMM[D][MRM] ACOMM(AAJ][106] DSD(KSK][104] VII-A DSP[F][PPI]/ACOMM[D][MRM] ACOMM(AAJ][106] DSD(KSK][106] VII-A MTT[SVK][101], WSN[BRI[106], POC(JSK][104] DCE(AAP)[104] MTT[B](SM]/F0C[B](JSK]/WSN[B](RKB) VII-A DE[B](PPI]/EDC[C](RKB) DE[NSJ][104] EDC(JSK)[104] III-A DE[B](PPI]/EDC[C](RKB) DE[NSJ][104] EDC(JSK)[104] III-A DE[B](PPI]/EDC[C](RKB) DE[NSJ][101] ACOMM(MRM][101] VII-A DEP[S](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] EM=III[106] VII-A DSP[E](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] EM=III[104] VII-A DSP[S](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] IIIIA VII-A DSP[S](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] IIIIIA VII-A DSP[S](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII</th> <th>VII-A MTT[SVK][101], WSN[RRI[[106], FOC/3K][104] MTT[A][UPP]/FOC[A](JSK]/WSN[A](SM] C H III-A DE[C][TUM]/EDC[D](PS8) 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DSD(KSK][104] L DE[PSB][101] VII-B MTT[SV(]103], POC(JSK][204] DCE[AAP][104] MTT[SV[]05], MTT[SV[]106] DEC[AS][104] EMFT[BA][104] MECH[VII-B DSP[5][PPI//EDC[C][RKB) DE[(NSJ)[104] EM/III[106] L EMI(UPP)[104] MECH[VII-B DSP[5][SSG]/ACOMM[F[KSK) ACOMM[AA][106] EM N CSE[RKB][101] N CSE[RKB][104] N<!--</th--><th>VILA WSUBRI[100], POC(SKI[100] MTT[A](UPP)/POC[A](JSK)/WSU[A](SM) C AID_(SSG](101], VUSUBRI[100], DOC(AAP)[104] IIIAA DE[C](TUM)/EDC[D](PSB) DE[NSI](104] EN-III[104] L DC[PSB](104] IIIAA DE[C](TUM)/EDC[D](PSB) DE[NSI](104] EN-III[104] L DC[PSB](102] CC[AAP][104] VI-A DSP[P](PPI)/ACDMM(D)[MMM) ACOMM(AAI][106] DSIN(SS(102)) DSIN(SS(102)) DSIN(SS(102)) DSIN(SS(102)) VI-A DSP[P](PPI)/ACDMM(D)[MMM) ACOMM(AAI][106] DSIN(SS(104)) DSIN(SS(104)) DSIN(SS(104)) EMFT(SSD(104)) EMFT(SSD(104)) EMFT(AAI)[106] EMFT(AAI)[106] EMTT[SSN(101)] EMTT[SSN(101)] EMTT[SSN(104)] EMTT[SSN(104)] DSIN(SS(104)) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) 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MTT(SVK)[101], WSN(BR)[106], POC/JSK)[104] III-A DE[C](TUM)/ III-B V-A DSP[F](PPI)/ACC V-B DSP[F](PPI)/ACC VII-B FDC(JSK)[101], WSN(BRI)[106], VII-A VII-A MTT(SVK)[101], WSN(BRI)[106], FDC(JSK)[104] III-A DE[B](PPI)/F III-A DE[B](SG)/AC VII-B DSP[E](SSG)/AC VII-B DSP[E](SSG)/AC VII-B DSP[E](SSG)/AC VII-B DE[F](TUM)/ V-A DE[F](UM)/ VII-A DE[H](UPP)// VII-A DE[H](UPP)// VII-A DE[H](UPP)// VII-A DE[H](UPP)// VII-A DE[H](UPP	VII-A MTT(SVK)[101], WSN(BRII][106], FOC(JSK)[104] MTT(SVK)[101], FOC(JSK)[104] III-A DE[C)(TUM)/EDC[D](PSB) III-B EMI(UPP)[104] V-A DSP[F](PPI)/ACDMM[D][MRM] VII-A MTT(SVK)[101], WSN(BRII[106], FOC(JSK)[104] DCE(AAP)[104] VII-B FOC(JSK)[104] DCE(AAP)[104] VII-B EDC(PSB)(DOE] VA VII-B DSP[E](SSG)/ACOMM[D](MRM) UII-A VII-B EDC(JSK)[104] DCE(AAP)[104] VII-B DSP[E](SSG)/ACOMM[F](KSK) UII-A VII-A MSN(BRII]06], POC(JSK)[104] DCE(AAP)[104] VII-A MSN(BRII]06], POC(JSK)[104] DCE(AAP)[104] VII-A MSN(BRII]06], POC(JSK)[104] DCE(AAP)[104] VII-A MSN(BRII]06], POC(JSK)[104] DCE(AAP)[104] VII-A MECH(PPM)[101] DCE(PII][106] VII-A MECH(PPM)[101] EM-III[104] III-A DE[H](UPP)/EDC[E](PSB) V-A VII-A DE[H](UPP)/EDC[E](PSB) VII-A VII-A DC(PPI)[106] VIII-A	VII-A MTT(SVK)[101], WSNBRIJ[106], FOC/JSK)[104] MTT[A](UPP)/FOC/J III-A DE(C)(TUM)/EDC[D](PSB) DE(NSJ)[104] III-B EIMI(UPP)[104] V-A DSP[F](PPI)/ACOMM(D)[MRM] ACOMM(AAJ][106] V-B DSP[F](PPI)/ACOMM(D)[MRM] ACOMM(AAJ][106] VII-B FOC(JSK)[104] MTT[B](SM)/FOC[B VII-B FOC(JSK)[104] MTT[B](SM)/FOC[B VII-B FOC(JSK)[104] MTT[B](SM)/FOC[B VII-B FOC(JSK)[104] MTT[B](SM)/FOC[B VII-B FOC(JSK)[104] DE(NSJ)[104] III-A DE[B](PPI)/EDC[C](RKB) DE(NSJ)[104] III-A DE[B](PPI)/EDC[C](RKB) DE(NSJ)[104] III-A DE[B](PPI)/EDC[C](RKB) DE(NSJ)[101] VI-B DSP[E](SSG/ACOMM[F](KSK) ACOMM(AAJ][106] VI-A WSNBRIJ[10E], FOC(JSK)[104] DE(NSJ)[104] III-A DE[F](TUM)/EDC[G](JSK) AIDL[A](SSG)/VLSI[4 VI-B DE[F](TUM)/EDC[G](JSK) ACOMM(AAJ][106] VI-A DSP[SLN][101] EMFT(SBD][101] VI-B	VII-A MTT[SVK][101], VII-B MTT[A][UPP]/F0C[A][JSK]/WSN[A][SM] VII-B F0C(JSK)[104] MTT[A][UPP]/F0C[A][JSK]/WSN[A][SM] III-B EMI[UPP][104] EMI[UPP]/E0C[A][JSK]/WSN[A][SM] VII-A DSP[F][PPI]/ACOMM[D][MRM] ACOMM(AAJ][106] DSD(KSK][104] VII-A DSP[F][PPI]/ACOMM[D][MRM] ACOMM(AAJ][106] DSD(KSK][106] VII-A MTT[SVK][101], WSN[BRI[106], POC(JSK][104] DCE(AAP)[104] MTT[B](SM]/F0C[B](JSK]/WSN[B](RKB) VII-A DE[B](PPI]/EDC[C](RKB) DE[NSJ][104] EDC(JSK)[104] III-A DE[B](PPI]/EDC[C](RKB) DE[NSJ][104] EDC(JSK)[104] III-A DE[B](PPI]/EDC[C](RKB) DE[NSJ][101] ACOMM(MRM][101] VII-A DEP[S](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] EM=III[106] VII-A DSP[E](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] EM=III[104] VII-A DSP[S](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] IIIIA VII-A DSP[S](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] IIIIIA VII-A DSP[S](SG]/ACOMM[F](KSK) ACOMM(AAJ][106] IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	VII-A MTT[SVK][101], WSN[RRI[[106], FOC/3K][104] MTT[A][UPP]/FOC[A](JSK]/WSN[A](SM] C H III-A DE[C][TUM]/EDC[D](PS8) DE[NSJ][104] EM-III[104] III-B EMI(UPP)[104] EM-III[104] IL VA DSP[F][PP]/ACDMM[D][MRM] ACOMM[AL][106] DSD(KSK][106] VI-A DSP[F][PP]/ACDMM[D][MRM] ACOMM[AL][106] DSD(KSK][106] VI-A DSP[F][PP]/ACDMM[D][MRM] ACOMM[AL][106] DSD(KSK][106] VI-A DSP[SI_N][104] MTT[SV(K][104] EDC(JSK][104] VI-A DE[8](PP]/ACCINM[P](KSK) ACOMM[AL][106] L VI-A DSP[SI_N][101] EMFT(SBD][101] ACOMM(MRM][101] V-A DSP[SI_N][101] EMFT(SBD][101] ACOMM(MRM][101] V+A DSP[SI_N][101] EMFT(SBD][101] ACOMM(MRM][101] V+A DSP[SI_N][104] AIDL[A](SSG]/VLSI[A](PSB)/DCE[A](AAP) N VI-A DSP[SI_N][101] EMFT(SBD][101] ACOMM(MRM][101] N VHA DSP[SI_N][104] AIDL[A](SSG]/VLSI[A](PSB)/DCE[A](AAP) H N <td< th=""><th>VIIA MTT[SV[]101] WSN[BR][206], POC/SC[]204 MTT[A][UPP]/FOC[A][JSK]/WSN[A][SM] H ED III-A DE[C](TUM]/E0C[D](PSB) DE[NSJ][204] EM=III[D4] L DE[C](SK][204] III-A DE[C](TUM]/E0C[D](PSB) DE[NSJ][204] EM=III[D4] L DE[C](SK][204] III-B EMI(UPP)[204] EMFT[SBD][101] ACOMMIMMI[102] N C VII-B DSP[7](PPI)/ACOMM[D][NRM] ACOMM[AA][106] DSD(KSK][104] L DE[PSB][101] VII-B MTT[SV(]103], POC(JSK][204] DCE[AAP][104] MTT[SV[]05], MTT[SV[]106] DEC[AS][104] EMFT[BA][104] MECH[VII-B DSP[5][PPI//EDC[C][RKB) DE[(NSJ)[104] EM/III[106] L EMI(UPP)[104] MECH[VII-B DSP[5][SSG]/ACOMM[F[KSK) ACOMM[AA][106] EM N CSE[RKB][101] N CSE[RKB][104] N<!--</th--><th>VILA WSUBRI[100], POC(SKI[100] MTT[A](UPP)/POC[A](JSK)/WSU[A](SM) C AID_(SSG](101], VUSUBRI[100], DOC(AAP)[104] IIIAA DE[C](TUM)/EDC[D](PSB) DE[NSI](104] EN-III[104] L DC[PSB](104] IIIAA DE[C](TUM)/EDC[D](PSB) DE[NSI](104] EN-III[104] L DC[PSB](102] CC[AAP][104] VI-A DSP[P](PPI)/ACDMM(D)[MMM) ACOMM(AAI][106] DSIN(SS(102)) DSIN(SS(102)) DSIN(SS(102)) DSIN(SS(102)) VI-A DSP[P](PPI)/ACDMM(D)[MMM) ACOMM(AAI][106] DSIN(SS(104)) DSIN(SS(104)) DSIN(SS(104)) EMFT(SSD(104)) EMFT(SSD(104)) EMFT(AAI)[106] EMFT(AAI)[106] EMTT[SSN(101)] EMTT[SSN(101)] EMTT[SSN(104)] EMTT[SSN(104)] DSIN(SS(104)) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) 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MTT[A][UPP]/FOC[A][JSK]/WSN[A][SM] H ED III-A DE[C](TUM]/E0C[D](PSB) DE[NSJ][204] EM=III[D4] L DE[C](SK][204] III-A DE[C](TUM]/E0C[D](PSB) DE[NSJ][204] EM=III[D4] L DE[C](SK][204] III-B EMI(UPP)[204] EMFT[SBD][101] ACOMMIMMI[102] N C VII-B DSP[7](PPI)/ACOMM[D][NRM] ACOMM[AA][106] DSD(KSK][104] L DE[PSB][101] VII-B MTT[SV(]103], POC(JSK][204] DCE[AAP][104] MTT[SV[]05], MTT[SV[]106] DEC[AS][104] EMFT[BA][104] MECH[VII-B DSP[5][PPI//EDC[C][RKB) DE[(NSJ)[104] EM/III[106] L EMI(UPP)[104] MECH[VII-B DSP[5][SSG]/ACOMM[F[KSK) ACOMM[AA][106] EM N CSE[RKB][101] N CSE[RKB][104] N </th <th>VILA WSUBRI[100], POC(SKI[100] MTT[A](UPP)/POC[A](JSK)/WSU[A](SM) C AID_(SSG](101], VUSUBRI[100], DOC(AAP)[104] IIIAA DE[C](TUM)/EDC[D](PSB) DE[NSI](104] EN-III[104] L DC[PSB](104] IIIAA DE[C](TUM)/EDC[D](PSB) DE[NSI](104] EN-III[104] L DC[PSB](102] CC[AAP][104] VI-A DSP[P](PPI)/ACDMM(D)[MMM) ACOMM(AAI][106] DSIN(SS(102)) DSIN(SS(102)) DSIN(SS(102)) DSIN(SS(102)) VI-A DSP[P](PPI)/ACDMM(D)[MMM) ACOMM(AAI][106] DSIN(SS(104)) DSIN(SS(104)) DSIN(SS(104)) EMFT(SSD(104)) EMFT(SSD(104)) EMFT(AAI)[106] EMFT(AAI)[106] EMTT[SSN(101)] EMTT[SSN(101)] EMTT[SSN(104)] EMTT[SSN(104)] DSIN(SS(104)) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[MM]/CMM]/CM[M]/M] NECH[APP(MM)/CDC[MM/CMM]/CM[M]/M] NECH[APP(MM)/CDC[MM/CM]/M] NECH[APP(MM)/CDC[MM/CM]/M] NECH[APP(MM)/CDC[MM/CM]/M] NECH[APP(MM)/CDC[MM/CM]/M] NECH[APP(MM)/CDC[MM/CM]/M] NECH[APP(MM/CM]/M]</th> <th>VIIIA MTT[XIV[[121]] POC[XV[[124] MTT[A][UPP]/POC[A](JSK)/WSN[A][SM] C AlloutSSS[101] VSN[VIIISE], DC[AAP][124] DC[PP][126] DC[PP][126] IIIA DE[C](TUM]/EDC[D][PSB) DE[MJ](120] EMM[UPP](124] EMM[UPP](124] EMM[UPP](124] EMM[UPP](124] DE[MI](120] EMM[UPP](124] DE[MI](120] DE[MI](120] DE[MI](120] DE[MI](120] DSP[C][AAP]/A VMA DSP[P][PP]/ACD/MM[D](MMM] ACOMM[AM](120] DSD[CSA(]126] C MECH[A]PPM() DC[PPI](126] DSP[C][AAP]/A VIIA MTTS[N[120] DE[MSI](120] EMM[IAD]/(MMM] ACOMM[AM[II20] U MECH[A]PPM() DC[PPI](126] DE[MI]PPI(124] DSP[C][AAP]/A VIIA DSP[S][SSG]/VCSR[120] DE[MSI]/101] EMM[ID6] U U EM(UPP](124] DC[PPI](126] DC[PPI](126]</th>	VILA WSUBRI[100], POC(SKI[100] MTT[A](UPP)/POC[A](JSK)/WSU[A](SM) C AID_(SSG](101], VUSUBRI[100], DOC(AAP)[104] IIIAA DE[C](TUM)/EDC[D](PSB) DE[NSI](104] EN-III[104] L DC[PSB](104] IIIAA DE[C](TUM)/EDC[D](PSB) DE[NSI](104] EN-III[104] L DC[PSB](102] CC[AAP][104] VI-A DSP[P](PPI)/ACDMM(D)[MMM) ACOMM(AAI][106] DSIN(SS(102)) DSIN(SS(102)) DSIN(SS(102)) DSIN(SS(102)) VI-A DSP[P](PPI)/ACDMM(D)[MMM) ACOMM(AAI][106] DSIN(SS(104)) DSIN(SS(104)) DSIN(SS(104)) EMFT(SSD(104)) EMFT(SSD(104)) EMFT(AAI)[106] EMFT(AAI)[106] EMTT[SSN(101)] EMTT[SSN(101)] EMTT[SSN(104)] EMTT[SSN(104)] DSIN(SS(104)) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) NECH[APP(MM)/CDC[C](MRM) 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Individual Timetable:

Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE. Department of Electronics & Telecommunication Engineering W.E.F. March 2022

		09:00-10:00	10:00-11:00	11:00-12:00	12:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00
	III-A		EM+III[104]	DE(NSJ)[104]			EDC(JSK)[106]		DE[A](KSK)/EDC[B](RKB)
	111-8		DE(PSB)[106]		EM+III[104]] L [EMI(UPP)[104]		EDC(PSB)[104]	
м	V-A		DSP(SLN)[101]	EMFT(SBD)[101]	CSE(RKB)[101]	U	DSP[A](PPI)/AC	COMM(B)(TUM)		
O N	V-B	TSP[D][SSG]/A	COMM(E](AAI)	ACOMM(AAJ)[106]	DSP(SSG)[106]	N C	DSD(KSK)[101]		EMFT(AAJ)[101]	
	VII-A	MTT(SVK)[101],				I H I		AIDUSSG [[101]]	DC(PPI)[106]	AICD(PPM)[101],
	VII-B	WSN(BRI)[106], FOC(JSK)[104]		MTT[A](UPP)/FOC[A](JSK)/WSN[A](SM)				VLSI(NSJ)[106], DCE(AAP)[104]		ESC(MRM)[106]
	III-A	DE[C](TUM)/	EDC(D)(PSB)	DE(NSJ)[104]			EDC(JSK)[104]	EMI(UPP)[104]	EM-III[104]	
	111-8		EMI(UPP)[104]		EM+III[104]		DE(PSB)[101])/EDC[F](AAJ)
т	V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]	t ů t		DSD(KSK)[101]		ACOMM(A)[TUM]
U		DSP[F](PPI)/ACC	1 11 1			N	CART AN UNCOT		(-l/ l/-	
E	V-8	MTT(SVK)[101],	and Alumant	ACOMM(AAJ)[106]	DSD(KSK)[106]	C H	EMFT(AAJ)[106]	DSP(SSG)[106]		
	VII-A	WSN(BRI)[106],	DCE(AAP)[104]	MTT[B](SM)/FOC[B](JSK)/WSN[B](RKB)			MECH[/	A](PPM)		AIDL(SSG)[101],
	VII-B	FOC(JSK)[104]							DC(PPI)[106]	VLSI(NSJ)(106)
	III-A	DE[B](PPI)/E	DC[C](RKB)	DE(NSJ)[104]	EDC(JSK)[104]				EMI(UPP)[104]	
	111-8		EDC(PS8)[106]		EM+III[106]	L	EMI(UPP)[104]		DE[G](PPI))/EDC[H](AAJ)
w	V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]	U	D\$P[B](AAP)/AC	COMM[C](MRM)		
E	V-B	DSP[E](SSG)/A(COMM[F](KSK)	ACOMM(AAJ)[106]		N C	CSE(RKB)[101]		DSD(KSK)[101]	DSP(SSG)[104]
-	VII-A	MTT(SVK)[101],				н		AID1(556)[101],	FM(AAP)[106]	AICD(PPM)[101],
	VII-B	WSN(BRI)[106], FOC(JSK)[104]	DCE(AAP)[104]	AIDL(A)(SSG)/VLB(A	A][PSB[/OCE[A]]AAP]		DC(PPI)[106] VLSI(NSI)[106]			ESC(MRM)[106]
	III-A			DE(NSJ)[104]			DE[D](UPP)	/EDC[A](JSK)		
	111-8	DE[F](TUM)/	EDC[G](JSK)		EM-III[104]	1 . 1		EDC(PSB)[106]	DE(PSB)[106]	
т	V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]	U		DSD(KSK)[101]	CSE(RKB)[101]	
H	V-B			ACOMM(AAJ)[106]		N C	EMFT(AAJ)[104]	CSE(RKB)[104]	DSD(KSK)[104]	DSP(SSG)[104]
Ŭ	VII-A		DC(PPI)[106]			Ĥ	FM(AAP)[106]			AICD(PPM)[101],
	VII-B	MECH(PPM)[101]	FM(AAP)[104]	AIDL(B)(SSG)/VLSI(BIISMI/DCE(BI(AAP)		DC(PPI)[101]	MECH	B](PPM)	ESC(MRM)[106]
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Dr. Babsaheb Ambedkar Technological University, Lonere

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Dr. Babsaheb Ambedkar Technological University, Lonere

Semester VII Sub:

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	Relevant Course Outcomes	CO1, CO2	CO3, CO4	
Sr. no.	ROLL NO	CA1 (10)	CA2 (10)	
1	2030331372005	9	9	
2	2030331372012	7	7	
3	2030331372010	9	9	
4	2030331372020	8	8	
5	2030331372001	8	8	
6	1930331372058	9	9	
7	2030331372021	7	7	
8	1930331372004	10	10	
9	1930331372066	8	8	
10	2030331372003	8	8	
11	1930331372081	10	10	
12	1930331372098	8	8	
13	1930331372012	8	8	
14	1930331372077	9	9	
15	1930331372015	8	8	
16	1930331372003	9	9	
17	1930331372033	8	8	
18	1930331372055	9	9	
19	1930331372104	8	8	
20	1930331372116	7	7	
21	1930331372064	8	8	
22	1930331372076	8	8	
23	1930331372093	8	8	
24	1930331372112	9	9	
25	1930331372008	8	8	
26	1930331372032	8	8	
27	1930331372068	9	9	
28	1930331372084	9	9	
29	1930331372061	8	8	
30	1930331372083	8	8	
31	1930331372088	7	7	
I	Average	8.29	8.29	
	%	82.90	82.90	

Assessment of Course Outcomes through CA1 and CA2

Assessment of Course Outcomes through MSE

	Relevant Course Outcomes	CO1, CO2	CO1, CO3	CO2, CO4	CO3, CO4	CO2, CO3	
Sr.							
no.	ROLL NO	Q.1	Q.2	Q.3	Q.4	Q.5	Total (20)
1	2030331372005	4	4	3	3	3	17
2	2030331372012	2	1	1	0	0	4
3	2030331372010	3	4	4	3	3	17
4	2030331372020	2	1	2	0	2	7
5	2030331372001	2	2	0	2	0	6
6	1930331372058	3	4	4	3	3	17
7	2030331372021	1	1	0	1	1	4
8	1930331372004	4	4	4	4	4	20
9	1930331372066	3	2	1	4	4	14
10	2030331372003	2	1	2	2	2	9
11	1930331372081	4	4	4	4	4	20
12	1930331372098	3	3	2	4	4	16
13	1930331372012	3	2	2	4	4	15
14	1930331372077	3	4	4	3	3	17
15	1930331372015	3	1	3	0	2	9
16	1930331372003	3	4	4	3	3	17
17	1930331372033	2	1	4	0	4	11
18	1930331372055	3	4	4	3	3	17
19	1930331372104	3	3	2	4	4	16
20	1930331372116	1	1	0	1	1	4
21	1930331372064	3	1	3	1	2	10
22	1930331372076	2	1	2	0	2	7
23	1930331372093	3	0	3	0	2	8
24	1930331372112	3	4	4	3	3	17
25	1930331372008	2	2	0	2	0	6
26	1930331372032	4	1	3	0	2	10
27	1930331372068	4	2	3	1	2	12
28	1930331372084	3	2	4	1	0	10
29	1930331372061	3	1	3	0	2	10
30	1930331372083	3	1	3	0	2	10
31	1930331372088	0	0	0	0	0	0
	Average	2.71	2.13	2.52	1.81	2.29	11.52
	%	67.75	53.25	63	45.25	57.25	57.60

Course	Assessment	Contribution to Programme outcomes in %					Attainment level of		Achievement	
Outcomes	Tool	PO1	PO2	PO3	PO4	PO5	course outcomes (%)		(Goal: 70%) In Yes/No	
	MSE Q.1	67.75	67.75	67.75	67.75	67.75	67.75			
	MSE Q.2	53.25	53.25	53.25	53.25	53.25	53.25			
CO1	CA1	82.90	82.90	82.90	82.90	82.90	82.90	75.97	Yes	
	Assignment	100	100	100	100	100				
	1						100			
	MSE Q.1	67.75		67.75	67.75		67.75			
	MSE Q.3	63		63	63		63			
CO2	MSE Q.5	57.25		57.25	57.25		57.25	74.18	Yes	
002	CA1	82.90		82.90	82.90		82.90	/ 4.10	103	
	Assignment 2	100		100	100		100			
	MSE Q.2			53.25		53.25	53.25			
	MSE Q.4			45.25		45.25	45.25			
	MSE Q.5			57.25		57.25	57.25			
CO3	CA2			82.90		82.90	82.90	70.68	Yes	
005	Assignment 2			100		100	100	70.00	105	
	Assignment 3			100		100	100			
CO4	MSE Q.3		63			63	63	72.78		
	MSE Q.3		45.25			45.25	45.25			
	CA2		82.90			82.90	82.90		Yes	
	Assignment 4		100			100	100			

Assessment of Course Outcomes

Assignment No. 1

- 1. What is Artificial Intelligence? List the task domains of Artificial Intelligence (AI).
- 2. What is Artificial Intelligence? Steps to Solve Problems in Artificial Intelligence.
- 3. What are the Agents in Artificial Intelligence. (https://www.geeksforgeeks.org/agents-artificialintelligence/?ref=lbp)
- 4. What are the Types of Environments in AI. (https://www.geeksforgeeks.org/types-of-environments-in-ai/?ref=lbp)
- 5. Difference between Informed and Uninformed Search in AI (https://www.geeksforgeeks.org/difference-between-informed-and-uninformed-search-in-ai/?ref=lbp)
- 6. Turing Test in Artificial Intelligence.

Assignment No. 2

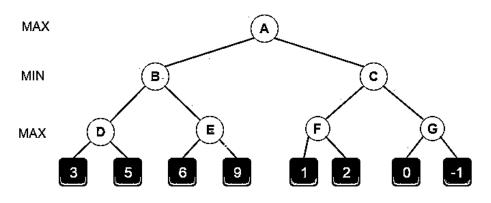
- 1. Define State Space Search. Explain in detail.
- 2. Define heuristic function in informed search algorithm.
- 3. Explain Breadth-first search (BFS) with an example. List down the advantages and disadvantages.
- 4. Write down the algorithm for Depth first search (DFS) along with an example. List down the advantages and disadvantages.
- 5. What do you mean by heuristic and heuristic search? What are the advantages of Heuristic Search?
- 6. Write and explain the A* algorithm with advantages and disadvantages.
- 7. What are the problem-solving and problem formulation steps in AI. (https://www.geeksforgeeks.org/problem-solving-in-artificial-intelligence/?ref=gcse)
- 8. Explain with example Iterative Deepening Depth First Search (IDDFS). (<u>https://www.geeksforgeeks.org/iterative-deepening-searchids-iterative-deepening-depth-first-searchiddfs/?ref=gcse</u>)
- 9. Explain the working of Greedy-Best-first search algorithm? Give advantages, disadvantages and applications. (<u>https://www.geeksforgeeks.org/greedy-best-first-search-</u> algorithm/?ref=gcse)

Assignment No. 3

- 1. Explain the water Jug problem as a state-space search.
- 2. Write and explain hill-climbing and steepest hill-climbing search algorithms in artificial intelligence.
- 3. A star Search Algorithm to Move from the start state to the final state 8 Puzzle Problem.

2	8	3		1	2	3
1	6	4		8		4
7		5		7	6	5
Initial State			Fin	al St	ate	

4. Explain the alpha-beta search algorithm. Also solve the following example using Alpha beta pruning. (https://www.geeksforgeeks.org/minimax-algorithm-in-game-theory-set-4-alpha-beta-pruning/?ref=gcse)



- 5. Given n, of a n x n chessboard, find the proper placement of queens on chessboard. (<u>https://www.geeksforgeeks.org/n-queen-in-on-space/?ref=lbp</u>)
- 6. What is Mini-max search for game playing. Explain the Min Max algorithm.(https://www.geeksforgeeks.org/minimax-algorithm-in-game-theory-set-1-introduction/?ref=gcse)

Assignment No. 4

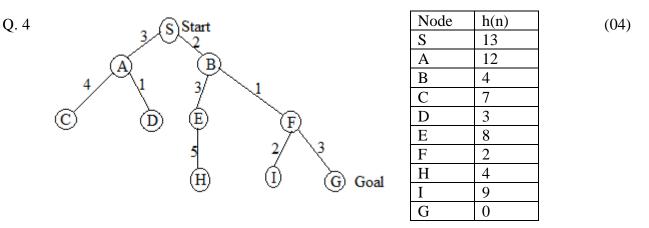
- 1. Write a note on propositional logic, forward chaining, backward chaining.
- 2. Explain the following planning methods 1. Planning with State-Space Search 2. Goal Stack Planning.
- i. What is the difference between supervised and unsupervised learning.
 ii. Write a note on linear regression.
- 4. What is Ensemble Learning? What are the types of ensemble learning?
- 5. Write a note on Expectation-Maximization (EM) algorithm.

Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE-402103 Department of Electronics and Telecommunication Engineering Mid Semester Examination

Class: B. Tech (Final Year)		Semester: VII
Subject: Artificial Intelligence and Deep Learning (BTETPE	703B)	Total Marks: 20
Date: 31/10/2022	Time: 10:00) am to 11:00 am

SOLVE ALL THE QUESTIONS.

- Q. 1 What are the informed search strategies. Explain Best First Search algorithm with (04) its characteristics.
- Q. 2 Explain briefly the different types of agent architectures (04)
- Q. 3 What are the uninformed search strategies. Explain Breadth First Search with (04) algorithm and its characteristic.



Provide the solution from start node to goal node at each iteration using Greedy BFS algorithm.

Q. 5 Define AI. Explain the concept of Turing test.

(04)

*****All the Best*****

COURSE FILE

EMPLOYABILITY AND SKILL DEVELOPMENT

[BTHM605]

Subject Teacher: Ms. Ratika R. Jadhav

Third Year

Electronics and Telecommunication Engineering



Dr. Babasaheb Ambedkar Technological University, Lonere

2022-23

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SYLLABUS

UNIT - 1

Soft Skills & Communication basics:

Soft skills Vs hard skills, Skills to master, Interdisciplinary relevance, Global and national perspectives on soft skills, Resume, Curriculum vitae, How to develop an impressive resume, Different formats of resume – Chronological, Functional, Hybrid, Job application or cover letter, Professional presentation- planning, preparing and delivering presentation, Technical writing.

UNIT - 2

Interpersonal Skills:

Critical Thinking, Assertiveness, Decision Making, Problem Solving, Negotiation, Building Confidence, Time Management, Personal Presentation, Assertiveness, negotiation, avoiding Stress.

Commercial Awareness:

Professional etiquettes and manners, Global negotiating and Persuading, Integrity. Global trends and statistics about civil engineering businesses.

UNIT - 3

Grammar and Comprehension:

English sentences and phrases, Analysis of complex sentences, Transformation of sentences, Paragraph writing, Story writing, Reproduction of a story, Letter writing, précis writing, Paraphrasing and e-mail writing.

UNIT - 4

Skills for interviews:

Interviews- types of interviews, preparatory steps for job interviews, interview skill tips, Group discussion- importance of group discussion, types of group discussion, difference between group discussion, panel discussion and debate, personality traits evaluated in group discussions, tips for successful participation in group discussion, Listening skillsvirtues of listening, fundamentals of good listening, Non-verbal communication-body movement, physical appearance, verbal sounds, closeness, time.

UNIT - 5

Problem Solving Techniques:

Problem solving model: 1. Define the problem, 2. Gather information, 3. Identify various solution, 4. Evaluate alternatives, 5. Take actions, 6. Evaluate the actions. Problem solving skills: 1. Communicate. 2. Brain storming, 3. Learn from mistakes.

TEXT/REFERENCE BOOKS

1. R. Gajendra Singh Chauhan, Sangeeta Sharma, "Soft Skills- An integrated approach to maximize personality", ISBN: 987-81-265-5639-7, First Edition 2016, WileyWren and Martin, "English grammar and Composition", S. Chandpublications.

2. R. S. Aggarwal, "A modern approach to verbal reasoning", S. Chandpublications.

3. Philip Carter, "The Complete Book of Intelligence Test", John Willey & SonsLtd.

4. Philip Carter, Ken Russell, "Succeed at IQ test", KoganPage.

5. Eugene Ehrlich, Daniel Murphy, "Schaum"s Outline of English Grammar", McGraw Hills.

6. David F. Beer, David A. McMurrey, "A Guide to Writing as an Engineer", ISBN: 978-1-118-30027-54th Edition, 2014, Wiley.

Course Outcomes

On completion of the course, student will be able to:

- 1. Have skills and preparedness for aptitude tests.
- 2. Be equipped with essential communication skills (writing, verbal and non-verbal)
- 3. Master the presentation skill and be ready for facing interviews.
- 4. Build team and lead it for problem solving.

Program Outcomes

1. Aptitude Test Proficiency:

- Graduates will demonstrate a high level of proficiency in aptitude tests commonly used by employers, enhancing their ability to excel in recruitment processes.
- Students will consistently achieve scores that place them in the top percentiles of aptitude assessments relevant to their field of study.

2. Effective Communication Skills:

- Graduates will exhibit exceptional written communication skills, capable of producing clear, concise, and persuasive documents for various professional contexts.
- Graduates will excel in verbal communication, demonstrating the ability to articulate ideas confidently and engage in meaningful conversations.
- Students will develop strong non-verbal communication skills, including body language and active listening, to effectively convey their messages and build rapport.

3. Mastery of Presentation and Interview Skills:

- Graduates will master the art of presentations, showcasing the ability to deliver compelling and informative presentations to diverse audiences.
- Students will be well-prepared for interviews, displaying confidence, professionalism, and effective responses to common interview questions.
- Graduates will demonstrate the capacity to adapt their interview and presentation skills to various professional settings and industries.

4. Team Leadership and Problem-Solving:

- Graduates will possess the skills necessary to build and lead diverse teams effectively, fostering collaboration and innovation.
- Students will demonstrate proficiency in problem-solving methodologies, using critical thinking and creative problem-solving techniques to address complex challenges.
- Graduates will consistently contribute to their organizations by leveraging their team leadership and problem-solving abilities to drive positive outcomes.

Overall, this program will equip students with the essential skills and knowledge required for a successful transition into the workforce, ensuring they are not only employable but also capable of thriving in their chosen careers.

Course Outcomes and Program Outcomes Mapping Table

Course	Program (Dutcomes
Outcomes	C01	CO2
PO1	High	High
PO2	High	High
PO3	High	Medium
PO4	High	High
PO5	Medium	Medium
PO6	Medium	Medium
PO7	Medium	Medium
PO8	Medium	Medium
PO9	Medium	Medium
PO10	Medium	Medium
PO11	Low	Medium
PO12	Low	Low

डॉ. बाबासाहेब आंबेडकर तंत्रशास्त्र विद्यापीठ, लोणेरे Dr. Babasaheb Ambedkar Technological University, Lonere

(Established under Act No XXIX of 2014 by Government of Maharashtra)

विद्याविहार, लोणेरे-रायगड-४०२ १०३ (महाराष्ट्र) Vidyavihar, Lonere - Raigad 402 103 (Maharashtra) Tel: (02140) 275142 Student Heipline : 02140-275212

Dr. Bhagwan F. Jogi Registrar

डॉ. भगवान फ. जोगी कुलसचिव

DBATU /REGIAC / 2022/34/A

Dated: 17 /02/ 2023

Academic Calendar–UG Sem. VI & VIII Revised(AY 2022–23)

Sr. No.	Activity	Commencement Date	Concluding Date	Total Days	Level
1	Commencement of Classes	20 th Feb 23	30 th May 23	100	UG
2	Mid Semester Examination	10 th April 2023	15 th Apr 23	05	UG
3	End of Classes		30 th May 23		UG
4	End Semester Examination	1 st June 23	10 th June 23	10	UG
5	Practical/Project/Seminar Examination 11 th June 23		20 th June 23	03	UG
6	Result Declaration		15 th July 23		
7	Commencement of Classes for Next semester	20 th July 23			
18 Feb – Mahashivratri 19 Feb – Chatrapati Shivaji Maharaj Jayanti 7 March – Dhulivandan 22 March – Gudi Padwa 30 March – Ram Navami 4 April – Mahavir Jayanti 7 April – Good Friday			14 April – Dr Babas Jayanti 22 April – Ramzan 1 May – Maharashtu 5 May – Buddha Po 29 June – Bakari Ei	Eid ra Din urnima	edkar

Copy submitted for information: Office of Hon'ble Vice-Chancellor Copy to:

- 1. All heads of departments
- 2. Affiliated Institutes
- 3. Academic Section
- 4. Controller of Examinations



F. Jogi

Dr. Babasaheb Ambedker Technological Universit LONERE 402 103,

Tal Mongaon, Dist. Ralgad, (Maharashtra)

Dr. B Registrar REGISTRAR

Dr. Babasaheb Ambedkar Technological University, Lonere Department of Electronics and Telecommunication Engineering

Subject: Employability & Skill Development **Class:** Third Year Pre-requisite: Communication Skills

Subject Code: BTHM605 Semester: VI Faculty: Ms. Ratika R. Jadhav

Marking Scheme

CA I-10 marks

CA II-10 marks

Mid Sem exam - 20 marks

Theory Paper- 60 marks

LESSON PLAN 2022-2023

Sr.	Date	UNIT	Contents
1. 2. 3. 4. 5. 6. 7. 8.	3 March to 9 March	Soft Skills & Communication basics	Soft skills Vs. hard skills Skills to master, Interdisciplinary relevance Global and national perspectives on soft skills Resume, Curriculum vitae How to develop an impressive resume, Different formats of resume – Chronological, Functional, Hybrid Job application or cover letter, Technical writing. Professional presentation- planning, preparing, and delivering presentations.
9. 10. 11. 12. 13. 14. 15. 16. 17.	13 March to 23 March	Interpersonal Skills & Commercial Awareness	Critical Thinking, AssertivenessDecision Making, Problem SolvingBuilding Confidence, Time ManagementPersonal Presentation, Assertiveness,Professional etiquettes and mannersGlobal negotiating and PersuadingNegotiation, Avoiding Stress.IntegrityGlobal trends and statistics about civilengineering businesses.
18. 19. 20. 21. 22. 23.	27 March to 12 April	Grammar and Comprehension	English sentences and phrases Analysis of complex sentences Transformation of sentences Paragraph writing, Story writing Reproduction of a story Letter writing, précis writing

24.			Paraphrasing and e-mail writing.
25.			Interviews- types of interviews, preparatory steps for job interviews, interview skill tips
26.			Group discussion- importance of group discussion, types of group discussion, difference between group discussion, panel discussion and debate
27.	17 April to 26 April	Skills for interviews	personality traits evaluated in group discussions, tips for successful participation in group discussion
28.			Listening skills - virtues of listening, fundamentals of good listening,
29.			Non-verbal communication-body movement, physical appearance, verbal sounds, closeness time.
30.			Problem solving model: 1. Define the problem
31.			2. Gather information, 3. Identify various solution
32.			4. Evaluate alternatives,
33.	2 May to 17	Problem-Solving	5. Take actions
34.	May	Techniques	6. Evaluate the actions
35.			Problem solving skills: 1. Communicate.

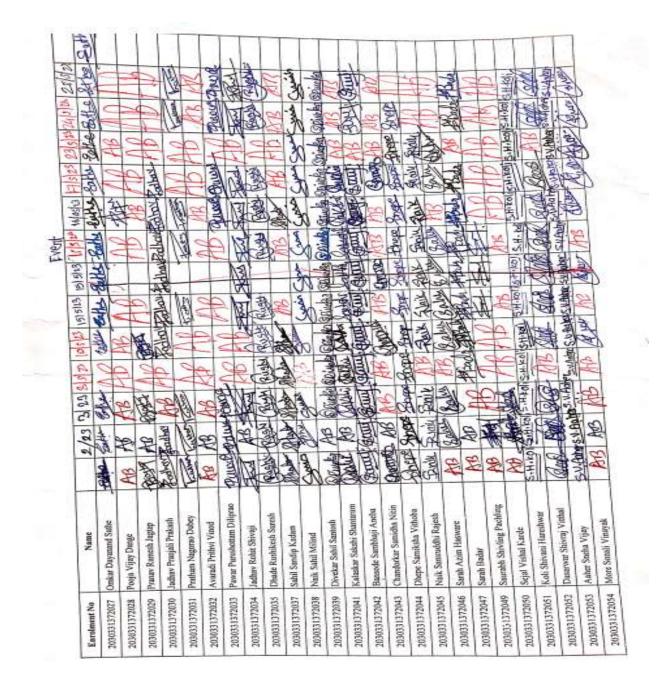
Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE.	Department of Electronics & rejectommunication Eliginetines
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2030331172018	Minute Manusi Anil	4	0	2	A DOL	1 100	- Lever	12	and a	An	113	BH	
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2020331312028	Posja Vijaj Dange	たほ	E	A.G	AB	BB	AG	THE	12k	A13	Brg	8	-	4
42022101000002	Pranto Ramosh Jugap	9	4	d	RB	ABO	THE	6	0	the state	TREE	the second	4	_
2630331372030	Judium Pranjuli Prakash	a	d	2	tollow	Techot	Tallar's	to Bark	Kontak	Aller	allo the	THAN IN	大田	
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200031372042	Avapla 71041 Viced	AA	면	A.B.	里	52	A.A.	NO.	EL2	Ec.Y	Page.	88		
2030331372033	Privat Perushasan Dépras	٩	4	4	Sand?	19:4	Pre-	A.	B.S.	M3	B.B.	AB	7	
10022111100002	Induar Robin Shives	d	٩	0	D	-	A-B-A	14th	track.	18 H	New Y	The second		1
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203031372037	Sahil Sardip Kadam	AB	AA	a	AG	Part of	一下の	2 hard	AN	上記	60	80%		
203031372038	Male Sahit Millind	AR	AB	d	AB	1 per	T	100	E	Ser.	Same	A.		
0002261000002	Dividuar SahR Sunnish	d	٩	9	AB	Electro	Batub	AU.	minister	10	R	Are a	Station 1	
1102261000682	Kaleskar Sakshi Shantyran	「「「	AG N	AG.	Julie .	Gunde	Cash in	T. Mala	C.Kidel	Contraction of	Cuble	Coloriso		
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Contraction of the	10		4	T III	1	11	14-11	11-11	EFB.	d	٩	đ	117
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12130331372581	SUDDHESH BRANDARS DANOADE	- Ale	ŧ	¢	1	A A	1	1	đ	Р	d	a	48
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62130331372516	KALE AKASH RAVINDRA	A	250	4	d	t	1 tols	Hel-	a	d	5	٩	deal
F2150031372519	KARKARE SUYOG SUBHASH	THE	N	4	d	d	173	123	AB	d	٩	a	the second
82130331372520	GHADGE PRATHAMESH SANTOSH	A	4	Deluter 1	100	一方の	PLAN (-the	193	٩	¢	St.	(BB)
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Assessment of Course Outcomes through Mid-Semester

PRN NO.	Name	Q1 (CO1) 5 Marks	Q2 (CO2) 5 Marks	Q3(CO3)5 Marks	Q4(CO4)5 Marks	Total Marks /20 Mid Sem
2030331372001	Jamdar Aakanksha S	5	5	5	5	20
2030331372002	Abhishek Sharma	5	5	5	5	20
2030331372003	Aditya Ranganathrao Kadam	5	5	5	5	20
2030331372005	Bade Afzal Azim	5	5	5	5	20
2030331372006	Mohite Anish Ashok	5	5	5	5	20
2030331372007	Bhalerao Ashish Suresh	5	5	5	5	20
2030331372008	Bhosale Balaji Bhausaheb	4	0	5	4	13
2030331372009	Bhagyashri Dinesh Kadvekar	3	5	5	4	17
2030331372010	Surati Chaitanya Dagadu	5	5	5	2	17
2030331372011	Dughrekar Chinmayi Kiran	5	5	5	5	20
2030331372012	Dhepe Dipeshri Dilip	5	5	5	5	20
2030331372013	Chaudhari Himanshu Mohanlal	5	5	5	5	20
2030331372014	Janmejay Ramakant Dhake	5	5	5	5	20
2030331372015	Ruikar Khushi Vishal	5	5	5	5	20
2030331372016	Mahesh Vijayakumar Kokane	3	5	5	2	15
2030331372017	Raul Manali Milind	5	5	5	5	20
2030331372018	Mhatre Manasvi Anil	4	4	5	4	17
2030331372019	Gharat Mayuresh Rajendra	5	5	3	3	16
2030331372020	Patil Meghraj Dilip	5	5	5	5	20
2030331372021	Guru Mohanish Sanjay	5	5	5	5	20
2030331372022	Mardaskar Nikita Babanrao	5	5	5	5	20
2030331372023	Kadam Niraj Anil	5	5	5	5	20
2030331372024	Pawar Om Sameer	3	5	5	4	17
2030331372025	Salunke Om Sunil	5	5	4	5	19
2030331372026	Zaware Omkar Harishchandra	5	5	5	3	18
2030331372027	Omkar Dayanand Sathe	5	5	4	5	19
2030331372028	Pooja Vijay Dange	5	5	5	3	18
2030331372029	Pranav Ramesh Jagtap	5	5	5	5	20

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2030331372030	Jadhav Pranjali Prakash	5	5	5	5	20
2030331372031	Pratham Nagorao Dubey	5	5	5	5	20
2030331372033	Pawar Purushottam Diliprao	5	0	5	5	15
2030331372034	Jadhav Rohit Shivaji	3	0	5	1	9
2030331372035	Dhade Rushikesh Suresh	5	5	5	5	20
2030331372037	Sahil Sandip Kadam	5	5	5	5	20
2030331372038	Naik Sahil Milind	5	5	5	5	20
2030331372039	Divekar Sahil Santosh	5	5	5	5	20
2030331372041	Kalaskar Sakshi Shantaram	5	5	5	5	20
2030331372042	Bansode Sambhaji Aneba	5	5	5	5	20
2030331372043	Chandorkar Samidha Nitin	5	5	5	5	20
2030331372044	Dhepe Samiksha Vithoba	5	5	5	5	20
2030331372045	Naik Samruddhi Rajesh	5	5	5	5	20
2030331372046	Sarah Azim Hasware	5	5	5	5	20
2030331372047	Sarah Badar	5	5	5	4	19
2030331372049	Saurabh Shivling Pachling	5	0	5	2	12
2030331372050	Sejal Vishal Karde	5	5	0	0	10
2030331372051	Koli Shivani Hareshwar	5	5	5	5	20
2030331372052	Dasarwar Shivraj Vitthal	5	5	5	1	16
2030331372053	Aaher Sneha Vijay	5	0	5	5	15
2030331372054	More Sonali Vinayak	5	5	5	5	20
2030331372055	Sonali Shivram Dalvi	5	5	5	5	20
2030331372056	Lokhande Srushti Raju	5	5	5	5	20
2030331372058	Shendge Suryaprakash	_	-	-	_	20
	Parmeshwar	5	5	5	5	20
2030331372059	Salunke Tanay Abhijeet	5	5	5	5	20

TEJAS PRABHAKAR THAKUR	4	5	5	0	14
TEJAS APPASAHEB KARWAR	4	3	4	5	16
MORE VAIBHAV GAJANAN	5	0	5	5	15
VAIBHAV GOROBA HAJGUDE	1	5	5	5	16
VAISHALI DADARAO SUKHDHANE	5	5	5	5	20
VICKY VISHNU KAPRE	5	5	5	5	20
VIDHI RAVINDRA POTWAR	5	5	5	5	20
VINEET VINOD SINGH	5	5	5	5	20
VINIT VINAYPRATAP SINGH	5	5	5	5	20
SIDDHESH BHANUDAS DANGADE	5	5	5	5	20
THAMKE NIYATI NATHURAM	0	0	0	0	0
IPTE RAHUL NARENDRA	5	5	5	5	20
KULKARNI AMEY PRASHANT	3	5	3	5	16
KHARVILKAR DIKSHA PUNDLIK	5	5	5	5	20
SHINDE AISHWARYA SAKHARAM	5	5	5	5	20
SEJAL NAMDEV KADAM	5	5	5	1	16
KADAM PRACHI BHARAT	5	5	5	5	20
SHINDE PRATIK ANANT	5	5	5	5	20
SATHE AMIT SUDHAKAR	5	5	5	1	16
NARWADE ROHINI RAJENDRA	4	5	5	5	19
MORE UPASANA SANJAY	5	5	5	1	16
ADITYA MANOJ VIBHUTE	5	5	5	5	20
ZORE POOJA BABAN	5	0	3	5	13
GAIKWAD KARAN SHATRUGHAN	0	5	2	0	7
KADVEKAR SHUBHAM SANDESH	4	5	0	4	13
JANSARI RESHANT JEETENDRA	5	5	4	4	18
KALE AKASH RAVINDRA	4	5	4	1	14
KARKARE SUYOG SUBHASH	5	5	5	4	19
	TEJAS APPASAHEB KARWARMORE VAIBHAV GAJANANVAIBHAV GOROBA HAJGUDEVAIBHAV GOROBA HAJGUDEVAISHALI DADARAO SUKHDHANEVICKY VISHNU KAPREVICKY VISHNU KAPREVIDHI RAVINDRA POTWARVINEET VINOD SINGHVINIT VINAYPRATAP SINGHSIDDHESH BHANUDAS DANGADETHAMKE NIYATI NATHURAMIPTE RAHUL NARENDRAKULKARNI AMEY PRASHANTKHARVILKAR DIKSHA PUNDLIKSHINDE AISHWARYA SAKHARAMSEJAL NAMDEV KADAMKADAM PRACHI BHARATSATHE AMIT SUDHAKARNARWADE ROHINI RAJENDRAMORE UPASANA SANJAYADITYA MANOJ VIBHUTEZORE POOJA BABANGAIKWAD KARAN SHATRUGHANKADVEKAR SHUBHAM SANDESHJANSARI RESHANT JEETENDRAKALE AKASH RAVINDRA	TEJAS APPASAHEB KARWAR4MORE VAIBHAV GAJANAN5VAIBHAV GOROBA HAJGUDE1VAIBHALI DADARAO SUKHDHANE5VICKY VISHNU KAPRE5VICKY VISHNU KAPRE5VIDHI RAVINDRA POTWAR5VINEET VINOD SINGH5SIDDHESH BHANUDAS DANGADE5THAMKE NIYATI NATHURAM0IPTE RAHUL NARENDRA5KULKARNI AMEY PRASHANT3KHARVILKAR DIKSHA PUNDLIK5SEJAL NAMDEV KADAM5SHINDE AISHWARYA SAKHARAM5SATHE AMIT SUDHAKAR5SATHE AMIT SUDHAKAR5ADITYA MANOJ VIBHUTE5ZORE POOJA BABAN5GAIKWAD KARAN SHATRUGHAN0KADVEKAR SHUBHAM SANDESH4JANSARI RESHANT JEETENDRA4	TEJAS APPASAHEB KARWAR43MORE VAIBHAV GAJANAN50VAIBHAV GOROBA HAJGUDE15VAISHALI DADARAO SUKHDHANE55VICKY VISHNU KAPRE55VICKY VISHNU KAPRE55VIDHI RAVINDRA POTWAR55VINEET VINOD SINGH55VINTT VINAYPRATAP SINGH55SIDDHESH BHANUDAS DANGADE55THAMKE NIYATI NATHURAM00IPTE RAHUL NARENDRA55KULKARNI AMEY PRASHANT35KHAR VILKAR DIKSHA PUNDLIK55SHINDE AISHWARYA SAKHARAM55SATHE AMIT SUDHAKAR55SATHE AMIT SUDHAKAR55NARWADE ROHINI RAJENDRA45MORE UPASANA SANJAY55ZORE POOJA BABAN50GAIKWAD KARAN SHATRUGHAN05KADVEKAR SHUBHAM SANDESH45JANSARI RESHANT JEETENDRA55KALE AKASH RAVINDRA45	TEJAS APPASAHEB KARWAR434MORE VAIBHAV GAJANAN505VAIBHAV GOROBA HAJGUDE155VAISHALI DADARAO SUKHDHANE555VICKY VISHNU KAPRE555VICKY VISHNU KAPRE555VIDHI RAVINDRA POTWAR555VINEET VINOD SINGH555VINTI VINAYPRATAP SINGH555SIDDHESH BHANUDAS DANGADE555THAMKE NIYATI NATHURAM000IPTE RAHUL NARENDRA555KULKARNI AMEY PRASHANT353KHARVILKAR DIKSHA PUNDLIK555SHINDE AISHWARYA SAKHARAM555SHINDE PRATIK ANANT555SATHE AMIT SUDHAKAR555NARWADE ROHINI RAJENDRA455ADITYA MANOJ VIBHUTE555ZORE POOJA BABAN052KADVEKAR SHUBHAM SANDESH450JANSARI RESHANT JEETENDRA454KALE AKASH RAVINDRA455	TEJAS APPASAHEB KARWAR 4 3 4 5 MORE VAIBHAV GAJANAN 5 0 5 5 VAIBHAV GOROBA HAJGUDE 1 5 5 5 VAISHALI DADARAO SUKHDHANE 5 5 5 5 VICKY VISHNU KAPRE 5 5 5 5 VIDHI RAVINDRA POTWAR 5 5 5 5 VINET VINOD SINGH 5 5 5 5 VINIT VINAYPRATAP SINGH 5 5 5 5 SIDDHESH BHANUDAS DANGADE 5 5 5 5 THAMKE NIYATI NATHURAM 0 0 0 0 IPTE RAHUL NARENDRA 5 5 5 5 KULKARNI AMEY PRASHANT 3 5 3 5 SHINDE AISHWARYA SAKHARAM 5 5 5 5 SHINDE AISHWARYA SAKHARAM 5 5 5 5 SHINDE AISHWARYA SAKHARAM 5 5 5 5

GHADGE PRATHAMESH SANTOSH	5	5	3	5	18
SHAIKH SHAIKHLAL SIKANDAR	5	5	5	5	20
VISHE SHRADDHA SACHIN	5	5	5	5	20
JANGAM AKSHAT RAJENDRA	5	5	3	5	18
KASREKAR PRANAY GIRISH	3	5	3	5	16
DHAMSHETTI AJINKYA ANIL	5	5	5	5	20
PADWAL ROHIT KISHOR	5	5	4	5	19
SHITOLE ADITYA RAJENDRA	5	5	5	5	20
CHAUDHARI GUNJAN LALIT	5	4	5	5	19
PATIL DIGVIJAY MADHUKAR	5	4	5	5	19
PRATIK PANDURANG LANGOTE	0	0	0	0	0
ABHIJIT NIMBULKAR	5	5	5	5	20
GAIKWAD SAYALI RAVIRAJ	5	5	5	5	20
SHIRKE DHANASHREE UDAY	5	5	5	5	20
PATKE HEMANT SANJAY	5	5	4	5	19
BIRADAR SHRUTI RAMAKANT	5	4	5	5	19
DHULE VRUSHABH ANANTA	5	5	5	5	20
KUTTARMARE AKANKSHA NARAYAN	5	5	5	5	20
SAKHARE YASH RAJESH	5	5	5	5	20
SHINDE MONIKA MAHADEV	5	5	5	5	20
SURVE SAMIR SANTOSH	5	1	3	2	11
AKSHAY SANTOSH DESHMUKH	5	5	5	4	19
SHINDE YASH VINAY	1	5	0	0	6
VIRAJ TEMBHE	5	5	5	5	20
	SHAIKH SHAIKHLAL SIKANDAR VISHE SHRADDHA SACHIN JANGAM AKSHAT RAJENDRA KASREKAR PRANAY GIRISH DHAMSHETTI AJINKYA ANIL PADWAL ROHIT KISHOR SHITOLE ADITYA RAJENDRA CHAUDHARI GUNJAN LALIT PATIL DIGVIJAY MADHUKAR PRATIK PANDURANG LANGOTE ABHIJIT NIMBULKAR GAIKWAD SAYALI RAVIRAJ SHIRKE DHANASHREE UDAY PATKE HEMANT SANJAY BIRADAR SHRUTI RAMAKANT DHULE VRUSHABH ANANTA KUTTARMARE AKANKSHA NARAYAN SAKHARE YASH RAJESH SHINDE MONIKA MAHADEV SURVE SAMIR SANTOSH AKSHAY SANTOSH DESHMUKH SHINDE YASH VINAY	SHAIKH SHAIKHLAL SIKANDAR5SHAIKH SHAIKHLAL SIKANDAR5VISHE SHRADDHA SACHIN5JANGAM AKSHAT RAJENDRA5KASREKAR PRANAY GIRISH3DHAMSHETTI AJINKYA ANIL5PADWAL ROHIT KISHOR5SHITOLE ADITYA RAJENDRA5CHAUDHARI GUNJAN LALIT5PATIL DIGVIJAY MADHUKAR5PATIK PANDURANG LANGOTE0ABHIJIT NIMBULKAR5GAIKWAD SAYALI RAVIRAJ5SHIRKE DHANASHREE UDAY5PATKE HEMANT SANJAY5BIRADAR SHRUTI RAMAKANT5DHULE VRUSHABH ANANTA5SAKHARE YASH RAJESH5SHINDE MONIKA MAHADEV5SURVE SAMIR SANTOSH5AKSHAY SANTOSH DESHMUKH5SHINDE YASH VINAY1	SHAIKH SHAIKHLAL SIKANDAR55SHAIKH SHAIKHLAL SIKANDAR55VISHE SHRADDHA SACHIN55JANGAM AKSHAT RAJENDRA55KASREKAR PRANAY GIRISH35DHAMSHETTI AJINKYA ANIL55PADWAL ROHIT KISHOR55SHITOLE ADITYA RAJENDRA55CHAUDHARI GUNJAN LALIT54PATIL DIGVIJAY MADHUKAR54PRATIK PANDURANG LANGOTE00ABHIJIT NIMBULKAR55GAIKWAD SAYALI RAVIRAJ55SHIRKE DHANASHREE UDAY55PATKE HEMANT SANJAY55BIRADAR SHRUTI RAMAKANT54DHULE VRUSHABH ANANTA55SAKHARE YASH RAJESH55SURVE SAMIR SANTOSH51AKSHAY SANTOSH DESHMUKH55SHINDE YASH VINAY15	SHAIKH SHAIKHLAL SIKANDAR55SHAIKH SHAIKHLAL SIKANDAR55VISHE SHRADDHA SACHIN55JANGAM AKSHAT RAJENDRA55SKASREKAR PRANAY GIRISH35JANGAM AKSHAT RAJENDRA55DHAMSHETTI AJINKYA ANIL55PADWAL ROHIT KISHOR55PADWAL ROHIT KISHOR55CHAUDHARI GUNJAN LALIT54SHITOLE ADITYA RAJENDRA55PATIL DIGVIJAY MADHUKAR54SPATIK PANDURANG LANGOTE00ABHIJIT NIMBULKAR55GAIKWAD SAYALI RAVIRAJ55SHIRKE DHANASHREE UDAY55PATKE HEMANT SANJAY55DHULE VRUSHABH ANANTA55SAKHARE YASH RAJESH55SAKHARE YASH RAJESH55SURVE SAMIR SANTOSH51AKSHAY SANTOSH DESHMUKH55SHINDE YASH VINAY15	SHAIKH SHAIKHLAL SIKANDAR 5 5 5 SHAIKH SHAIKHLAL SIKANDAR 5 5 5 VISHE SHRADDHA SACHIN 5 5 5 JANGAM AKSHAT RAJENDRA 5 5 3 5 JANGAM AKSHAT RAJENDRA 5 5 3 5 JANGAM AKSHAT RAJENDRA 5 5 5 5 KASREKAR PRANAY GIRISH 3 5 3 5 DHAMSHETTI AJINKYA ANIL 5 5 5 5 PADWAL ROHIT KISHOR 5 5 5 5 SHITOLE ADITYA RAJENDRA 5 5 5 5 CHAUDHARI GUNJAN LALIT 5 4 5 5 PATIL DIGVIJAY MADHUKAR 5 4 5 5 PATIK PANDURANG LANGOTE 0 0 0 0 ABHJIT NIMBULKAR 5 5 5 5 GAIKWAD SAYALI RAVIRAJ 5 5 5 5 SHIRKE DHANASHREE UDAY 5

ASSIGNMENTS

Assignment 1:

- 1. What are soft skills, explain with an example.
- 2. What are hard skills, explain with an example.
- 3. Explain Soft Skills to master
- 4. Explain Interdisciplinary relevance
- 5. Explain Global and national perspectives on soft skills
- 6. What is resume? [Summary]
- 7. What is Curriculum Vitae (CV)? [Course of Life]
- 8. Explain difference between Resume and CV
- 9. How to develop an impressive resume?
- 10. Explain different formats of Resume?
- 11. Explain difference between Job application and Cover letter.
- 12. Write a Cover letter for B.Tech passed out fresher student in Electronics and Telecommunication
- 13. Explain PROFESSIONAL PRESENTATION PLANNING
- 14. EXPLAIN TECHNICAL WRITING

Assignment 2:

- 1. What is Interpersonal Skills?
- 2. Write Short Notes on:
- Critical Thinking,
- Assertiveness,
- Decision Making,
- Problem Solving,
- Negotiation,
- Building Confidence,
- Time Management
- 3. Explain Professional etiquettes and manners

Assignment 3:

- 1. What is Interview and types of interviews?
- 2. Explain Preparatory steps for job interview
- 3. Explain Interview skill tips
- 4. Explain Problem solving model

Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE-402103

Department of Electronics and Telecommunication Engineering

Mid Term Examination April 2022-23

Class: B. Tech (Third Year)Semester: VISubject: EMPLOYABILITY AND SKILL DEVELOPMENT (BTHM605)Date: 21/4/2023Total Marks: 20Time: 1 hr.

ALL QUESTIONS CARRY EQUAL MARKS

Q. 1	What are soft skills, explain any five soft skills with an example.	(05)
Q. 2	Write a Cover letter applying for an internship position.	(05)
Q. 3	Solve any one (A or B)A) Explain difference between Resume and CVB) Explain different formats of Resume?	(05)
Q.4	 Solve any one (A or B) A) What is Interpersonal Skills, explain any five with an example. B) Explain Global and national perspectives on soft skills 	(05)

----- ALL THE BEST -----

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2023

Course	: B. Tech.	Branch :EXTC	Semester :Vl	[
Subject	t Code & Name: B	THM606 Employability & S	Skill Development		
Max M	arks: 60	Date: 28/07/2023	Duration: 3 Hrs.		
1. 2. 3.	question is based is Use of non-program		e question. is allowed.	O) on which the	2
Q. 1	Solve Any Two o	f the following.	(I	Level/CO) Mar	ks
A)	What are soft skil	ls, explain any five with an ex	xample.	CO1, CO2	6
B)	Explain Professio	nal Etiquette and Manners.		CO1, CO2	6
C)	·	pdate EMAIL: Share an upda respective guide. [Don't mer		CO1, CO2	6
Q.2	Solve Any Two o	f the following.			
A)	What are Interper	sonal Skills, explain any five	with an example	CO 4	6
B)		er for B.Tech passed out frestion your personal information		CO 4	6
C)	What are the key (CV)?	differences between a resume	e and a curriculum vitae	CO 4	6
Q. 3	Solve Any Two o	f the following.			
A)	Explain Global ar	nd national perspectives on so	ft skills.	CO 2	6
B)	Explain how to de	evelop an impressive Resume		CO 4	6

C)	What are the virtues of listening and what are the fundamentals of good listening?	CO 4	6
Q.4	Solve Any Two of the following.		
A)	Write a short story in $200 - 250$ words, with the help of the cues given below. Give a suitable title and write the moral of the story.	CO3	6
	Rahul, a young boydreams of becoming a successful businessman Inspired by a local entrepreneur success storyRahul starts small ventures to support his familyWith his friend Amit's supportRahul studies business strategieslearns from successful entrepreneursA business competition with a scholarshipturning pointDespite challenges He wins the scholarshipRahul's success inspires his communitybrings positive changesHis story provesno dream is too big to achieve.		
B)	Mention Interview skill tips that would assist the candidate in a successful interview.	CO2	6
C)	State and explain the problem-solving model steps in detail.	CO3	6
Q. 5	Solve Any Two of the following.		
A)	Write a short note on 1) Critical thinking 2) Assertiveness 3) Time Management.	CO3	6
B)	How to effectively plan, prepare, and deliver a professional presentation?	CO3	6
C)	Difference between group discussion vs Panel discussion vs Debate?	CO3	6

*** ALL THE BEST ***

Course	Assessment		ribution mes in		Progr	amme	Attain of	ment level course	Achievement (Goal: 70%)
Outcomes	Tool	PO1	PO2	PO4	PO5	PO6	outcon	nes (%)	In Yes/No
	MSE Q 1	46	46	46	46	46	46		
	MSE Q 3	52	52	52	52	52	81		
CO1	MSE Q 4	94	94	94	94	94	94		
CO1	Assignment1	80	80	80	80	80	80		
	Assignment2	100	100	100	100	100	100	89.09%	
	Assignment3	91	91	91	91	91	91		Yes
	MSE Q 2	45	45	45	45	45	60		
	Assignment1	96	96	96	96	96	96		
CO2	Assignment2	100	100	100	100	100	100		
	Assignment3	92	92	92	92	92	92		
	Assignment4	96	96	96	96	96	96		

Department of Electronics and Telecommunication Engineering

COURSE FILE

Analog Integrated Circuit Design (BTETPE704B) Fourth Year (VIIth SEM)



Subject Teacher: Prashant Prabhakar Mahajan

Academic Year: 2022-2023

INDEX

Sr. No.	POINT
1	Syllabus
2	Course Outcomes
3	Program Outcomes
4	CO-PO Mapping Table
5	Academic Calendar
6	Lesson Plan
7	Time Table
8	Assignment Question bank
10	Question papers
11	Student Attendance
12	Student Performance in MID-SEM Exam
13	Assessment of Course Outcomes through MSE
14	Assessment of Course Outcomes through Assignments
15	Assessment of Course Outcomes

SYLLABUS

UNIT - 1

Introduction to Simulations

Introduction to Advanced Design System and Cadence Virtuoso, DC Simulations, AC Simulations, Harmonic Balance, Envelope Simulation, Electromagnetic Simulations- FEM, MOM, FDTD, Circuit Net listing.

UNIT - 2

MOSFET Device Physics & Modeling

MOSFET Structure, Threshold Voltage, Drain Current Equation, Transfer & Output Characteristics, Weak/Moderate/Strong Inversion, Linear/Triode/Saturation Region of Operation, Device Leakages and Losses, Short Channel Effects, High Frequency Small Signal Model of MOSFET, Cubic, BSIM and Materka Models of MOSFET.

UNIT - 3

Few Transistor Circuits

Current Mirrors, Common Source/Common Gate/Common Drain Amplifiers, Design and Analysis of CS/CG/CD Amplifiers, Cascode Amplifiers, Differential Gain Stage, Frequency

Response & Design Trade-offs, Telescopic Cascode and Wide Swing Cascode Current Mirrors, PTAT, CTAT & Bandgap Bias Circuits.

UNIT - 4

Operational Amplifiers & OTAs

Design of Classical Op-Amps, Op-Amp Characteristics, Analysis and Trade-offs, Wideband Op-Amps, High Speed Op-Amps, Very High Gain Op-Amps, Operational Transconductance Amplifiers, Ultra Low Power OTAs for Medical Implants, Folded Cascode Op-Amps.

UNIT - 5

Biasing Schemes

Voltage and Current References, Vt reference bias, PTAT Current Reference, CTAT and Bandgap Voltage References, High Precision Voltage References, Voltage Level Shifters. UNIT - 6

Non-Linear Circuits

Single and Balanced Diode Mixers, Translinear Cell, Gilbert Cell Mixers, Power Amplifiers, Even & Odd Order Mixing, In-Modulation (AM, PM Conversions) Distortions, Intermodulation Distortions, Intermodulation Products, ACPR & EVM.

TEXT/REFERENCE BOOKS

- 1. Tony Chan Carusone, David A. Johns, Kenneth W. Martin, "Analog Integrated Circuit Design," John Wiley & Sons Keliu Shu, Edgar Sanchez-Sinencio, "CMOS PLL Synthesizers," Springer
- 2. Jose Carlos Pedro, Nuno Borges Carvalho, "Intermodulation Distortion in Microwave and Wireless Circuits," Artech House Stephen A. Maas, "Microwave Mixers," Artech House.

Course Objectives

Introduction to Circuit Simulation & EM Simulations.

- 1. Deep Understanding of MOS Device Physics & Modeling.
- 2. Understanding of few transistor circuits like common gate, common source & common drain amplifiers with their frequency response.
- 3. Understanding of Operational Amplifier Design & Trade-offs.
- 4. Advanced Op-Amps and OTAs.
- 5. Temperature Compensated Biasing Schemes.

Course Outcomes

After successfully completing the course students will be able to

- 1. Describe the models for active devices in MOS and Bipolar IC technologies.
- 2. Describe layout considerations for active and passive devices in analog ICs.
- 3. Analyze and design IC current sources and voltage references.
- 4. Describe the noise sources and models applicable to ICs.
- 5. Understand and appreciate the importance of noise and distortion in analog circuits.
- 6. Analyze integrated circuit noise performance.
- 7. Analyze and design IC operational amplifiers.

Program Outcomes

- 1. The graduates will possess the knowledge of differential equations, vector calculus, complex variable, matrix theory, probability theory, physics, chemistry, and electrical & electronics engineering
- The graduate will demonstrate an ability to identify, formulate and solve Electronics & Telecommunication engineering problems
- 3. The graduates will have an ability to design electronic circuits and systems, analyze and interpret data.
- 4. The graduates will have an ability to design digital and analog systems and components
- 5. The graduates will possess the knowledge of advanced and emerging topics in the fields of

Electronics, Signal Processing and Communication

- 6. The graduates will demonstrate the skills to use modern engineering tools, software and equipment's to analyze and solve real-life problems
- 7. The graduate will have broad understanding of the impact of Electronics and Telecommunication field in economic, environmental, and social context and will be aware of the contemporary issues
- 8. The graduates will possess communication skills necessary to communicate engineering ideas. The skills set include verbal, written and listening skills.
- 9. The graduates will demonstrate the ability to work and collaborate in heterogeneous teams.
- 10. The graduates will demonstrate the awareness of professional and ethical responsibilities
- 11. The graduates will develop self-confidence and ability for lifelong learning.

Course Outcomes and Program Outcomes Mapping Table

Course					Program	Outcon	nes				
Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	High	Low	Medium	Medium	High	Low	-	-	-	Medium
CO2	-	High	Medium	High	High	High	Low	-	-	-	Low



डॉ. बाबासाहेब आंबेडकर तंत्रशास्त्र विद्यापीठ, लोणेरे



Dr. Babasaheb Ambedkar Technological University, Lonere

(Established under Act No XXIX of 2014 by government of Maharashtra) विद्याविहार, लोणेरे-रायगड ४०२ १०३ (महाराष्ट्र) Vidyavihar, Lonere - Raigad 402 103 (Maharashtra) Tel: (02140) 275142 के Student Helpline: 02140-275212 Website: www.dbatu.ac.in, E-mail: registrar@dbatu.ac.in

Dr. Bhagwan F. Jogi

Registrar

डॉ. भगवान फ. जोगी कुलसचिव

Dated:12/ 08/2022

SI. No.	Activity	Commencement Date	Concluding Date	Total Days	Engineering
1	Admissions: B.Tech. Second, Third and Final Year; M.Tech. Second year.	September 01, 2022	September 10, 2022	10	UG and PG
2	Commencement of Classes of Second, Third and Final Year	September 01, 2022	December 19, 2022	110	UG and PG
3	Dissertation Examination of the Academic Year 2021-2022	September 01, 2022	September 10, 2022	10	PG
4	Mid-Semester Examinations	October 12, 2022	October 21, 2022	09	UG and PG
5	Submission of Dissertation Proposal to University	October 18, 2022	October 21, 2022	04	PG
6	Display of Mid-Semester Examination Marks	October 28, 2022	October 31, 2022	04	UG and PG
•7	Scrutiny of Master's Level Dissertation Work Proposal	November 01, 2022	November 03, 2022	03	PG
8	Exam Form Filling for Regular & Supplementary Examinations	November 01, 2022	November 08, 2022	08	UG and PG
9	Exam Form Filling for Regular & Supplementary Examinations with Late Fee	November 09, 2022	November 15, 2022	07	UG and PG
10	University Tech Fest 2021	November 17, 2022	November 19, 2022	03	UG and PG
11	End of Classes	-	December 19, 2022	110	UG and PG
12	Practical/Project/Seminar Examinations	December 20, 2022	December 23, 2022	04	UG and PG
13	Uploading Internal, Mid Semester, Practical, Project and Seminar marks on University portal	December 22, 2022	December 24, 2022	03	UG and PG
14	End Semester Regular & Supplementary Examination	December 26, 2022	January 21, 2023	26	UG and PG
15	Internship/Industrial Training#				
16	Vacation	January 1, 2023	January 20, 2023	20	Faculty and Staff

Academic Calendar 2022-23 (Odd Semester) (Engineering)

Dr.	Website: www.d Bhagwan F. Jogi Registrar	batu.ac.in, E-mail: registrar@dl	batu.ac.in		गवान फ. जोर्ग ज़्लसचिव
1	al (as rip of) manual of	ol rs and marched a	Ar deal	Date	: 12/08/2023
	Compared Class	February 1, 2023	May 31,	120	UG and P
17	Commencement of Classes	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2022		

#Industrial training will be carried out after completion of odd semester or in the staggered manner in the period of entire odd semester (Preferably on Saturdays, Sundays and Holidays) and partially in the vacation after odd semester. Another option could be permit the training in online mode which is not less than 120 hours.

Table 2 : List of Festivals / Holidavs

Sl. No. Festivals / Holiday		Date
1	Dasara	Wednesday, 05 October, 2022
2	Diwali Laxmi Pujan	Monday, 24 October, 2022
3	Diwali Balipratipada	Wednesday, 26 October, 2022
4	Guru Nanak Jayanti	Tuesday, 08 November, 2022

Table 3 : Following Holidays fall on Sunday

02 October, 2022
09 October, 2022
25 December, 2022

12.08.2022 (Dr. B. F. Jogi) Registrar

Dr. Babasaheb Ambedkar Technological University, Lonere Department of Electronics and telecommunication Engineering

Subject: Analog Integrated Circuit Design Class: Third Year Pre-requisite: EDC, Digital Electronics, Analog Circuits Subject Code: BTETPE704B Semester: VII Faculty: Mr. Prashant P Mahajan

End Sem Paper- 60 marks

Marking Scheme CA1, CA2 = 10 Marks Mid-Sem = 20 marks

Lesson Plan

UNIT	CHAPTER	LECT	TOPICS
NO.	NAME	NO.	
		1	Review of MOS transistor models
		2	NMOS, PMOS characteristics
		3	Transistor as switch
Ŧ	MOS	4	Non-ideal behavior of MOS transistor
Ι	Basics	5	Threshold Voltage, Channel Length Modulation
		6	Velocity saturation, Subthreshold leakage
		7	Transistor working in linear, saturation, cutoff
		8	High frequency Model of MOSFET
		9	Working of basic MOS current mirror
		10	Cascode current Mirror and its output resistance
		11	Common Source amplifier
		12	Common Gate amplifier
	Few	13	Common drain amplifier
	Transis	14,15	Telescopic Cascode amplifier
II	tor		
	circuits	16,17	Frequency response of CS, CD amplifiers with active
		10	load.
		18	Wide Swing Cascode current mirror
		19	PTAT, CTAT and bandgap bias circuit
		17	1 1111, OTTIT und buildgup blus choult
	Operati	20	Design of classical OP-Amps
	onal	21	OP-amp Characteristics, analysis, and Trade-off
III	amplif	22	Wide band OP-amps
	iers &	23	High speed, very high gain op-amps
	OTAs	24	Operational Transconductance Amplifier (OTA)
		25	Static power dissipation
	Biasing	26	Voltage and current references
IV	Scheme	27	PTAT current reference
	S	28	CTAT bandgap voltage references
		29	High precision voltage references
	Nor 19	30	Single and balanced diode mixers
V	Non-linear circuits	31	Trans linear cell
	circuits	32	Gilbert Cell mixers

		33	Power Amplifiers
		34	Even and odd order mixing
		35	Introduction to Cadence software
	Introdu	36	DC simulations
371	ction to	37	AC simulations
VI	simulati	38	Electromagnetic simulations
	ons	39	FEM, MOM
		40	Circuit net listing

TIME-TABLE

Department of Electronics & Telecommunication Engineering

Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE. Department of Electronics & Telecommunication Engineering W.E.F. March 2022

					W.E.F. M					
	_	09:00-10:00	10:00-11:00	11:00-12:00	12:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00
	III-A		EM-III[104]	DE(NSJ)[104]		1 1	EDC(JSK)[106]			/EDC[B](RKB)
	III-B		DE(PSB)[106]		EM-III[104]	L	EMI(UPP)[104]		EDC(PSB)[104]	
M O	V-A		DSP(SLN)[101]	EMFT(SBD)[101]	CSE(RKB)[101]	UN	DSP[A](PPI)/ACOMM[B](TUM)			
N	V-B DSP[D](SSG)/ACOMM[E](AAJ)		ACOMM(AAJ)[106]	DSP(SSG)[106]	C	DSD(KSK)[101]		EMFT(AAJ)[101]		
	VII-A	MTT(SVK)[101],				H		AIDL(SSG)[101],	DC(PPI)[106]	AICD(PPM)[101],
	VII-B	WSN(BRI)[106], FOC(JSK)[104]		MTT[A](UPP)/FOC[A](JSK)/WSN[A](SM)			VLSI(NSJ)[106], DCE(AAP)[104]		ESC(MRM)[106]
	III-A	DE[C](TUM),	/EDC[D](PSB)	DE(NSJ)[104]			EDC(JSK)[104]	EMI(UPP)[104]	EM-III[104]	
	III-B		EMI(UPP)[104]		EM-III[104]	L	DE(PSB)[101]		DE[E](KSK)	/EDC[F](AAJ)
T	V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]	U		DSD(KSK)[101]	DSP[C](AAP)/A	COMM(A)[TUM]
U	V-B	DSP[F](PPI)/AC	DMM(D)[MRM]	ACOMM(AAJ)[106]	DSD(KSK)[106]	N C	EMFT(AAJ)[106]	DSP(SSG)[106]		
-	VII-A			NATT[D]/SAA)/COCID		н	har cut			AIDL(SSG)[101],
	VII-B	WSN(BRI)[106], FOC(JSK)[104]	DCE(AAP)[104]	MTT[B](SM)/FOC[B	i](JSK)/WSN[B](RKB)		MECH[/			VLSI(NSJ)[106]
	III-A	DE[B](PPI)/	EDC[C](RKB)	DE(NSJ)[104]	EDC(JSK)[104]				EMI(UPP)[104]	
	III-B		EDC(PSB)[106]		EM-III[106]	L	EMI(UPP)[104]		DE[G](PPI)	/EDC[H](AAJ)
w	V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]	U	DSP[B](AAP)/AC	OMM[C](MRM)		
E	V-B	DSP[E](SSG)/A	COMM[F](KSK)	ACOMM(AAJ)[106]		N C	CSE(RKB)[101]		DSD(KSK)[101]	DSP(SSG)[104]
_	VII-A	MTT(SVK)[101],				н		AIDL(SSG)[101],	FM(AAP)[106]	AICD(PPM)[101],
	VII-B	WSN(BRI)[106], FOC(JSK)[104]	DCE(AAP)[104]	AIDL[A](SSG)/VLSI[/	A](PSB)/DCE[A](AAP)		DC(PPI)[106]	VLSI(NSJ)[106]		ESC(MRM)[106]
	III-A			DE(NSJ)[104]			DE[D](UPP)	/EDC[A](JSK)		
	III-B	DE[F](TUM)	/EDC[G](JSK)		EM-III[104]	L		EDC(PSB)[106]	DE(PSB)[106]	
Т	V-A		DSP(SLN)[101]	EMFT(SBD)[101]	ACOMM(MRM)[101]	U		DSD(KSK)[101]	CSE(RKB)[101]	
н	V-B			ACOMM(AAJ)[106]		N C	EMFT(AAJ)[104]	CSE(RKB)[104]	DSD(KSK)[104]	DSP(SSG)[104]
Ŭ	VII-A		DC(PPI)[106]			Ĥ	FM(AAP)[106]			AICD(PPM)[101],
	VII-B	MECH(PPM)[101]	FM(AAP)[104]	AIDL[B](SSG)/VLSI[I	B](SM)/DCE[B](AAP)		DC(PPI)[101]	MECH	[B](PPM)	ESC(MRM)[106]
	III-A		EM-III[104[EM-III[104]	EDC(JSK)[104]			EMI(UPP)[104]	EMI(UPP)[104]	
	III-B	DE[H](UPP)	EDC[E](PSB)		EMI(UPP)[101]	L	EDC(PSB)[106]	DE(PSB)[106]		
F	V-A			DSD(KSK)[101]		UN	ACOMM(MRM)[101]	DSD(KSK)[101]	CSE(RKB)[101]	CSE(RKB)[101]
î	V-B			CSE(RKB)[106]	CSE(RKB)[106]	c	EMFT(AAJ)[104]			
	VII-A		DC(PPI)[106]		/ESC(A)[MPM]	н		1/ECC[D]/CMA)	MECH/DDM)[104]	MECH/RRM\[104]
	VII-B		FM(AAP)[101]	AICD[A](PPM)	/ESC(A)[MRM]		AICD[B](PPM	// coctoj(owi)	MECH(PPM)[104]	MECH(PPM)[104]
S	VII-A			C175.0	ACHING			GATE COACHING		DEPARTMENTAL METTING
T	VII-B			GATE CO	DACHING			GATE COACHING		DEPARTMENTAL METTING
										•

Prof. S. L. Nalbalwar Head, Department of Electronics and Telecommunication Engineering

Question Bank AY 2022-23

<u>Assignment 1</u>

DATE OF DISPLAY: 10/10/2022

Analog Integrated Circuit Design (AICD)

Semester VII

Assignment No. 1

- Q1. Explain working of nMOSFET in three regions i.e., accumulation/weak/strong inversion
- Q2. Draw & explain MOSFET VI characteristics in detail and explain working of MOSFET in cutoff, triode and saturation region.

Q3. Explain following Short Channel Effects (SCE's) in MOSFET

- 1. Hot carrier effect
- 2. Mobility Degradation
- 3. Tunneling
- 4. DIBL
- 5. Punch through

Q4. Draw low frequency and high frequency small signal model for MOSFET.

Q5. Draw basic current mirror circuit and find its output impedance.

Q6. Draw Common Source amplifier with active load and derive the expression for gain.

Q7. Draw Common Gate amplifier with active load and derive the expression for gain.

Q8. Draw Common Drain amplifier with active load and derive the expression for gain.

Q9. Draw and explain Cascode amplifier with active load and derive expression for gain.

Q10. Draw the MOS differential pair with active load and derive gain expression.

LAST DATE OF SUBMISSION: 17/10/2022

NOTE:

- No marks will be awarded for assignments which are submitted after 17/10/2022
- · Assignment 1 should be submitted in OFFLINE mode only
- All questions should be solved in good hand writing.
- All questions should be solved on pages and not in any notebooks.
- This assignment is not question bank for mid semester exam.

Assignment 2

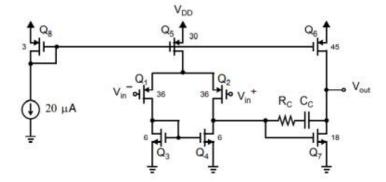
Date of Display: 7/12/2022

Assignment 2

Analog Integrated Circuit Design (AICD)

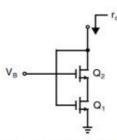
Q1) Draw the block diagram of two stage OPAMP and explain each stage in detail.

Q2) Calculate Gain for two stage CMOS OPAMP with purely capacitive load shown below.



Assume power supply of VDD=1.8V, assume process parameters of 0.18µm CMOS technology.

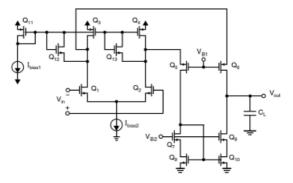
- Q3) Draw the second order small signal model for two stage CMOS OPAMP and obtain expression for unity gain frequency (ω_{ta})
- Q4) What is Slew Rate (SR) of OPAMP. Obtain expression for SR for CMOS OP-AMP.
- Q5) Explain the role of compensating capacitor Cc on two stage CMOS OPAMP.
- Q6) Explain wide swing current mirrors in detail.
- Q7) Draw the circuit diagram of folded Cascode op-amp and derive the gain expression.
- Q8) Calculate output impedance of two transistor diode connected circuit shown below using small signal analysis, assume both transistors in saturation region, ignore body effect.



Q9) An Operational Transconductance Amplifier (OTA) has G_{ma}=5 mA/V and DC gain of 45 dB. What is its output impedance r_{out}

Date of Display: 7/12/2022

Q10) For the folded Cascode OPAMP shown

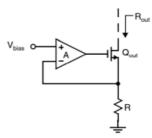


(Please refer transistor sizes Table 6.1 Carusone book)

 $I_{bias1} = 20 \mu A$ and $C_L = 10 pF$ find Unity Gain Frequency and Slew Rate (SR)

Q11) Write a short note on Common Mode Feedback Circuit (CMFB)

Q12) For the circuit shown below using small signal analysis find the output impedance. Approximate this value for large value of A.



Last Date of Submission: 14/12/2022

NOTES:

- 1) Kindly submit assignment within due date. (OFFLINE MODE ONLY)
- 2) Assignments submitted late will be given least marks.
- If a student is not able to submit assignment due to medical or other reasons, still will be reduced accordingly.

CA1 & CA2 Evaluation Criteria

$Test \rightarrow$	CA1	CA2
Criteria	Marks allocated	for assignments
Assignment1	10	
Assignment2		10

a. ** Correct answering of tricky questions answered during regular classes is also considered for CA1 and CA2 evaluation. Those who answered questions correctly are considered for 1 or 2 extra marks in addition to the marks obtained after assignment completion.

Question Papers AY 2021-22

DR BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

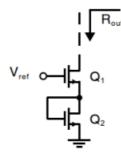
Department of Electronics and Telecommunication Engineering

Mid Semester Examination- October 2022

Subject: Analog Integrated Circuit Design	Subject Code: BTETPE704B
Semester: VII	Date: 31/10/2022
Max Marks: 20	Duration: 1 Hour

NOTE: 1. Answer any FOUR questions out of the following

- 2. Each question carries FIVE marks
- Q 1) Draw nMOS VI characteristics and explain working in Cutoff, Linear and Saturation region
- Q 2) Explain 'Hot carrier effect' in MOSFET
- Q 3) Draw the basic current mirror circuit and obtain expression for output impedance.
- Q 4) Derive the output impedance of circuit shown below. Ignore body effect.



Q 5) For a common source amplifier with an active load derive equation of low frequency small signal voltage gain.

	DR. BABAS	SAHEB AMBEDKAR TECHNO	DLOGICAL UNIVERSITY, LONERE		
		Winter Examinat	ion – 2022		
	Course: B. Tech.	Branch: E&TC	Semester: VII		
	Subject Code & Name: B	TETPE704B & Analog Integ	rated Circuit Design		
	Max Marks: 60	Date:7/02/2023	Duration: 2:00 To 5:00 PM		
	the question is be 3. Use of non-progr	1 2	tors is allowed.	D) on which	
				Level/(CO)	Mar
Q. 1	Solve Any Two of the fo	llowing.			1
A)	Draw two stage CMOS C	P-AMP amplifier. Consider	ing low frequency response,	1/7	
	obtain gain expression.				
B)	What are the advantage	s & drawbacks of a Cascod	e current mirror?	1/3	
C)	Write a short note on ba	and gap voltage references		1/3	
Q.2	Solve Any Two of the fo	llowing.			1
A)	G			2/1	

obtain expression for -3dB frequency.

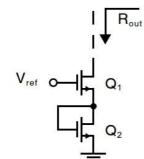
B)	For circuit shown in Q.2 A), assume all transistors have $\frac{W}{L} = \frac{100 \mu m}{1.6 \mu m}$	2/1	6
	Take $I_{bias} = 100 \ \mu A$, $R_S = 180 \ K\Omega$, $C_L = 0.3 \ pF$, $C_{gs1} = 0.2 \ pF$, $C_{gd1} =$		
	$0.015 \text{ pF}, C_{db1} = 20 \text{ fF}, C_{gd2} = 22 \text{ fF}, C_{db2} = 36 \text{ fF}$		
	Estimate: -3dB frequency.		
	(Use $0.8~\mu m$ CMOS technology, parameters are given below		
	$\mu_p C_{0X} = 30 \; \mu A/V^2 \; \mu_n C_{0X} = 92 \; \mu A/V^2 \; \left(\lambda L\right)_n = 0.\; 12 \; \mu m/V$		

$$(\lambda L)_p = 0.08 \,\mu m/V$$
 $V_{tn} = 0.8 \,V$ $V_{tp} = -0.90 \,V$)

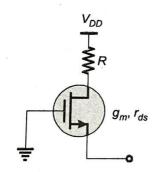
C) Derive output resistance of the circuit shown below. Ignore body effect.

1/5

6

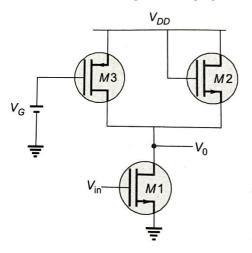


Q. 3	Solve Any Two of the following.		12	
A)	Draw the telescopic Cascode amplifier & obtain the expression for low	1/5	6	
	frequency gain.			
B)	For common source amplifier with active load assume I_{bias} =100 μ A, all transistors	2/1	6	
	have W/L= 10 μ m/0.4 μ m and use device parameters are those of 0.35 μ m			
	CMOS process. What is overall gain?			
	(For 0.35 µm CMOS process, $\mu_p C_{0X} = 55~\mu A/V^2~\mu_n C_{0X} = 190~\mu A/V^2$			
	$(\lambda L)_n = 0.16 \ \mu m/V \ (\lambda L)_p = 0.16 \ \mu m/V)$			
C)	Explain following short channel effects in MOSFET	1/1	6	
	1. Punch Through			
	2. Hot Carrier Effect			
Q.4	Solve Any Two of the following.		12	
A)	Draw and explain V-I characteristics of both pMOS and nMOS. Which one is	2/1	6	
	better?			
B)	What is Slew Rate of OP-AMP. Obtain expression for Slew Rate of CMOS OPAMP	1/7	6	
C)	How Millers theorem is used to obtain -3dB frequency of a common source	2/3	6	
	amplifier with active load			
Q. 5	Solve Any Two of the following.		12	
A)	Explain the effect of Body on threshold voltage and drain current of MOSFET	1/1	6	
B)	Using low frequency small signal model of MOS device, the equivalent resistance	2/5	6	
	seen is			



C) In the circuit shown in figure, the channel length modulation of all transistors of 2/5 all transistors is non-zero. Also, transistors operate in saturation and have negligible body effect. The ac small signal voltage gain (V₀/V_{in})

6



*** End ***



Student Attendance

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Gore Govind Ashok	1930331372005	A	AB	P	P	F	2 1	P	2000	ALACA	A	AXAO	dola	ADA	(spara)	A
Vaishnavi Sudhir Tar	1930331372010	-		AB	AB	P	P P	F	60400	AL Dat	CAPITO I	AC	giany	N	A	Sec
Pushpak dilip gaikwad	1930331372011					AB	AB	Ace		AB	Sec.	AB	AB	you	the.	
Harshal Umeshwar Borkar	1930331372011		-	100			AB	AB	AB	AD	AB	PUN	pur.	fur.	aur-	A
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Awais Hishamuddin Kauchali	1930331372016		1	2	A		P	þ	no	AB	AB	1-14	AB	AB	Y	EV.
Rumana nisar sain	1930331372031			1		No.	P	P	axus	AB	AB	Com	AB	AB	Quai	Ru
Sushant Sunil Mhatre	1930331372054	100		100			AB	P	Inal	hout	AB	AB	AB	AB	AB	A
Chinmay Milind Dhodare	1930331372056		1000	183	13 200	Tilles	Tures	Totes	uan	Hole	then	tan	Times	Tur	AB	An
Sumit Sudhakar admane	1930331372060				2	AB	AB	AB	AB	AB	Frie	The	10	Tain	that	4
Tupsakhare Ravikant Chandraprakash	1930331372067			AB	26	AB	AB	P	Rout	Rut	DAUA	Doit	Dank	ADUE	0	æ
SOHAM DEVDATTA PETHE	1930331372078		1	P	P	P	P		GR	40	and and	SR-	42	37.	Yun	BX
Harshdeep Dudhmal	1930331372087	-		AB	ÀB	AB	HAS	MB	adul	all	AB	6B	AB	AB	AB	AL
Deepak Sheshrao Lokhande	1930331372088			1	1	1	R	D	The Pake	teal	The	The	Freel	T	TEL	Ton
Niraj Gangadhar Ingole	1930331372090						-	MB	40	Php.	25	AB	mad		FILLE	An
Jayesh Yogesh Shendurnikar	1930331372091	Same Tar				0		K	AB.	MI7 M2	- hull	NWY	Into	AB	Hoth)	2HY
Adesh Santosh Salsundar	1930331372093						22		Black	And	SORIE	Stalind	enno	Rund	Lend	-
Sameer Athawale	1930331372096							-	00	Carlina -	00	10	CD 10	10	THUN	A
Shubham kadam	1930331372099			-					AB	AB	91.	The second	AB	AB	AB	A
Rashmi Ravindra Rajake	1930331372100							V	order	my	ouz		AB	out	AB	-
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Manmath Hanmantrao Chandankar	1930331372106			1100	1.200			AB	Backet	AB	Black	AB	fordy	AB	AB	4
Shrinivas Baliram Rathod	1930331372107				Y	V	-	14	Baf	Gf	Sef	Cef	Gf	Gel	AB	A
Rohit Ghanshyam Ingole	1930331372109		1	100	AB	AB		3-20/2	Broch	Brack	Braple	Brath	AB .	Sape	Roge	Pro
Atul Vikas Mhatre	1930331372111			2 All	gry	87	201P	AB	2m	and	AB	m/	20%	AB	AB	N
Mayank vivek patil	1930331372115		1		AB	AB	AB	AB	AB	AB	AB	AB	-	apali	AB	At
Aniket Hatkar	20181137210074				AB	AB	8B	AB	AB	AB	AB	AB	AB	AB	AB	A
Abhishek Jawake	20181137210129	AB	AB	AB	AB	AB	AB	AB	AB	PB	AB	NO	hn	AB	AB	A

Course Instructor Prashant P Mahaian

	PRN	7-10-22	10-10-2	13-10-22	14-10-22	17-10-20	4-11-22	7-11-22	7-11-22	0-11-27	1-11-12-	13-11-22	8-11-22	21-11-22	25-11-22	25-11-22
Sagar shashikant yalanj	1930331372002	29	SA	Sor	SF	AB	AB	AB	AB	AB	AB	AB				AB
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Awais Hishamuddin Kauchali	1930331372016	110	W	KA	KA	AB	AB	AB	T	T	W	W		MA	MA	NO
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Sushant Sunil Mhatre	1930331372054	AB	Soball	An	AR	AB	AB	Shak	state	Storil			Intrate			AB
Chinmay Milind Dhodare	1930331372056	AB	the	TUR	mi	AB	AB	AB	Tools	Toway	The	turn	AB-	-		AB
Sumit Sudhakar admane	1930331372060	AB	The	Fib	TE	TOP	Tas	the	AB	AB	AB.	Tra	TA	to	te	At
Tupsakhare Ravikant Chandraprakash	1930331372067	Poul	Rail	Rale	Parto	POLLO	Rate	Pole	Bal	Row	Potto	Porte	Rout	12	Rell	Role
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Harshdeep Dudhmal	1930331372087	AB	AB	AB	AB	Jal, G	aller	AB	r	T	AB	AB	AB	AB	the	AB
Deepak Sheshrao Lokhande	1930331372088	Tany.	AB	Tort-	E.	Duy.	Toy-	P			aug.	Trey	ant.	Toef	SENT.	TOOL
Nıraj Gangadhar Ingole	1930331372090	AB	diado	Zap)	Liaits	Alaot	Xiagh		1/		AB	KIDON	An	AB-	Qual	200
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Sameer Athawale	1930331372096	T	AB	AB	AB	AB	AR	T	Quart	AB	genere	AD	AB	1	T	AB
Shubham kadam	1930331372099		AB	1	1	Jung.	gly-		AB	AB	AB	AB	T			T
Rashmi Ravindra Rajake	1930331372100	201	AB	- 7	1	Bolto	Biles	Rojale	AB	Parke	Portes	Salat				1.4 94
Prajwal Sanjay Palimkar	1930331372105	20	AB	AB	AB	AB	AB	T	AB	AB	0,00	An	AB			
Manmath Hanmantrao Chandankar	1930331372106	V	AB	Stock 4	Manaka	Boulies	(bole	1	AB	AB	T	13000	1.1	2-		
Shrinivas Baliram Rathod	1930331372107	AB	AB	Cal	Ro	AB	AB	B	AB	Gest		Ca	MB			
Rohit Ghanshyam Ingole	1930331372109	Bagole	Brad	RAPE	Pagat	Back	Bapie	Brape	AB	Brgot	Salo	Bret	1			
Atul Vikas Mhatre	1930331372111	20N/	AB	2m	32	AB	AB	MB	1	T	200	AB				
Mayank vivek patil	1930331372115		apari	Bapali		and		a K			26	T				
Aniket Hatkar	20181137210074	AB	AB	na la	AB	AB	AB				11					
Abhishek Jawake	20181137210129	AB	AB	Abic	Rhin		AB	00				OP	AB			AB
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Dept. Electronics & Telecommunication Engineering

Name	PRN	28-11	2-12-22	2-12-22	5-12-2	29-12-21	9-12-28	12-12-22	12-12-22	N6-12-2	+6-12-22	19-12-22	19-12-22	-	
Sagar shashikant walanj	1930331372002	AB	AB	AB	AB	12.3		1		1000			1	and the	
Gore Govind Ashok	1930331372005	PAD	AVAD D	AND	9260	\$109	(ASB)	3/19	- ALKE	AND	Stell	ALAO	ALAD	-	-
Vaishnavi Sudhir Tar	1930331372010	For.	AB	AB	AB	to.	for	gas	Ser	\$15.	500	JE.	Son		
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Harshal Umeshwar Borkar	1930331372014	0.8	AB	AB	QR-	QB-	UB-	(B)S	(all)	4				1.1	1
Awais Hishamuddin Kauchali	1930331372016	X	AB	AB	AB	H	20-		1000	22.2	13.43				
Rumana nisar sain	1930331372031	Pisair	AR	AB		Puxin	Plan	Quai	Resar	-	126	2			1.000
Sushant Sunil Mhatre	1930331372054	Stat	Stat								Arbei	House	Strate	- 0	all the second
Chinmay Milind Dhodare	1930331372056	AB	TTOLL	Teller	AB	tu	tais	Tan	TOE	Ille-	telan	Tour	tu	100	1.000
Sumit Sudhakar admane	1930331372060	Tra	AB	AB	AB	The	Tot	Too	The	Tra	AT	top	That		
Supsakhare Ravikant Chandraprakash	1930331372067	Rue	Roug	Paul	Pice-	Danie	Roll	TOD	POUD	Poul	Rate	Reit	Rail		-
SOHAM DEVDATTA PETHE	1930331372078	AT.	AB	AB	AB	Ski	SK	a.	Sto	Est.	at.	85	St	50000	
larshdeep Dudhmal	1930331372087	AB	AB	AB	Rudlut	Mally	Will	all	FUDD	ally	Budy	200	and	r.	
eepak Sheshrao Lokhande	1930331372088	AB	AB	AB	AB		0		0~2		Freet	Top	D.Gef	States and	1997
liraj Gangadhar Ingole	1930331372090	Rook	AB	AB	AB	State	ZEE		2.4	1999	nost.	01.	1911		
iyesh Yogesh Shendurnikar	1930331372091	AR.	Just	happ	AB	Juit	Jult	Jult	Joya	Jayon	-	1		1997 - 19	
Adesh Santosh Salsundar	1930331372093	Ralbord ?	Hallmor S	Almar	AB	Alende	Admit			4	-		1	197 - C.	1000
Sameer Athawale	1930331372096	- Sama	AB	AB	AB	Canart			2000	Compo	(Charles	faur	Spermen		
hubham kadam	1930331372099	An	AB	AB	AB	19.00	12125	1.000		-				5	
tashmi Ravindra Rajake	1930331372100		AB	AB	AB		1000		35.00		1	-	2.0		
rajwal Sanjay Palimkar	1930331372105		AB	AB	AB	1	. Tes-	1200		1	27.9	1999			
Aanmath Hanmantrao Chandankar	1930331372106	Kauston	AB	AB	AB				1000		-				
hrinivas Baliram Rathod	1930331372107	Fal	Ref	Seef	AB		1.1	-		-	300			-	1000
cohit Ghanshyam Ingole	1930331372109	TAT	Borgote	Rack		Baple	Pope	Pape	Role	Rack	For.	BAPR	Byole	100 - 100 -	32.00
Atul Vikas Mhatre	1930331372111		25-1	25/	AB			-			- 1-		Ja	100	- Ser
Nayank vivek patil	1930331372115	-	AB	AB	AB			1000	100	1000		-		100 S (100)	15
aniket Hatkar	20181137210074	Same.	AB	AB	DB			1	1997.98	100			-	1000	10000
Abhishek Jawake	20181137210129	11	Ellandorus	Buston	Palalis	Andre	Gliw	Alin	aspone	Tartow	(Aldran	allow	alater	-	-

Student Performance

Sr	ROLL NO	Mid Sem marks	CA-1 (10)	CA-2 (10)	Total (40)
NO		(20)			
1	20150338	0	10	10	20
2	1930331372060	10	10	10	30
3	20181137210129	0	10	10	20
4	20181137210074	10	10	10	30
5	1930331372115	10	10	10	30
6	1930331372005	19	10	10	39
7	1930331372010	08	10	10	28
8	1930331372011	01	10	10	21
9	1930331372014	11	10	10	31
10	1930331372016	06	10	10	26
11	1930331372031	07	10	10	27
12	1930331372054	09	10	10	29
13	1930331372056	04	10	10	24
14	1930331372067	11	10	10	31
15	1930331372078	14	10	10	34
16	1930331372087	00	10	10	20
17	1930331372088	04	10	10	24
18	1930331372090	05	10	10	25
19	1930331372091	07	10	10	27
20	1930331372093	15	10	10	35
21	1930331372096	03	10	10	23
22	1930331372099	00	10	10	20
23	1930331372100	01	10	10	21
24	1930331372105	00	10	10	20
25	1930331372106	00	10	10	20
26	1930331372107	01	10	10	21
27	1930331372109	03	10	10	23
28	1930331372111	07	10	10	27

Assessment of Course Outcomes through MSE

MSE Question numbers	Q.1/5	Q.2/5	Q.3/5	Q.4/5	Q.5/5
Relevant Course Outcomes	CO1	CO2	CO3	CO4	C05
20150338	0	0	NA	NA	0
1930331372060	4	0	3	NA	03
20181137210129	0	0	0	0	0
20181137210074	3	NA	3	NA	4
1930331372115	4	NA	4	NA	2
1930331372005	5	NA	5	5	4
1930331372010	0	0	4	4	NA
1930331372011	0	0	0	0	1
1930331372014	1	NA	4	2	4
1930331372016	0	NA	2	1	3
1930331372031	1	NA	3	4	1
1930331372054	2	NA	5	NA	2
1930331372056	1	1	1	NA	1
1930331372067	3	1	4	1	2
1930331372078	3	1	5	0	5
1930331372087	0	NA	0	NA	NA
1930331372088	2	0	NA	NA	2
1930331372090	0	0	1	NA	4
1930331372091	0	2	NA	1	0
1930331372093	1	2	5	2	5
1930331372096	NA	NA	1	NA	2
1930331372099	NA	NA	0	NA	NA
1930331372100	0	0	1	NA	0
1930331372105	0	0	0	NA	NA
1930331372106	NA	0	NA	0	0
1930331372107	0	NA	0	NA	1
1930331372109	0	0	1	NA	2
1930331372111	2	NA	5	NA	NA
Average	1.28	0.4375	2.375	1.667	2.086
Percentage	25.6	8.75	47.5	33.34	41.72

*NA = Not Attempted

Assessment of Course Outcomes through Assignments

Assignment No	Relevant Course Outcomes	Number of Students Completed Assignments	Total Number of Students	Percentage
1	CO1, CO2, CO3	28	28	100
2	CO4, CO5, CO6	28	28	100

Assessment of Course Outcomes

comes	tool	Contrib	oution to	o Progra	am Outco	omes in 9	%		Contribu tion to Program	Attainme nt level of	Achieve ment (goal
Course Outcomes	Assessment tool	PO2	PO3	PO4	PO5	PO6	PO7	P011	Outcome s in %	Course Outcome s in %	70%) In Yes/ No
	MSEQ1	25.6	25.6	25.6	25.6	25.6	25.6	25.6	25.6		
	MSEQ2	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75		
CO1	Assignm ent 1	100	100	100	100	100	100	100	100	58.58	NO
COI	Assignm ent2	100	100	100	100	100	100	100	100		
	MSEQ2	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75		
CO2	Assignm ent 1	100	100	100	100	100	100	100	100	69.58	NO
	Assignm ent2	100	100	100	100	100	100	100	100		
	MSEQ3	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5		
CO3	Assignm ent 1	100	100	100	100	100	100	100	100	82.5	Yes
	Assignm ent2	100	100	100	100	100	100	100	100		
	MSE Q4	33.34	33.3 4	33.3 4	33.34	33.34	33.3 4	33.34	33.34		
CO4	Assignm ent 1	100	100	100	100	100	100	100	100	77.78	Yes
	Assignm ent 2	100	100	100	100	100	100	100	100		
CO5	MSE Q5	41.72	41.7 2	41.7 2	41.72	41.72	41.7 2	41.72	41.72		
	Assignm ent 1	100	100	100	100	100	100	100	100	80.57	Yes
	Assignm ent 2	100	100	100	100	100	100	100	100		
CO6	Assignm ent 1	100	100	100	100	100	100	100	100	100	Yes
	Assignm ent 2	100	100	100	100	100	100	100	100		

Department of Electronics And Telecommunication Engineering

COURSE FILE

Analog Communication(BTETC503) Third Year (Vth SEM)



Subject Teacher: Mohini Rajesh Mehta

Academic Year : 2022-2023

INDEX

Sr. No.	POINT
1	Syllabus
2	Course Outcomes
3	Program Outcomes
4	CO-PO Mapping Table
5	Academic Calendar
6	Lesson Plan
7	Time Table
8	Assignment Question bank
10	Question papers
11	Student Attendance
12	Student Performance in MID-SEM Exam
13	Assessment of Course Outcomes through MSE
14	Assessment of Course Outcomes through Assignments
15	Assessment of Course Outcomes

SYALLABUS

UNIT – 1 Introduction to Communication System

Block schematic of communication system, Simplex and duplex systems, Modes of communication: Broadcast and point to point communication, Necessity of modulation, Classification of modulation, sampling theorem and pulse analog modulation, multiplexing: TDM, FDM.

UNIT – 2 Amplitude Modulation

Introduction, Mathematical analysis and expression for AM, Modulation index, Frequency spectrum and bandwidth of AM, Power calculations, Generation of AM using nonlinear property, Low and high level modulation, Balance Modulator. Types of AM: DSB-FC, DSB-SC, SSB-SC, ISB and VSB, their generation methods and comparison.

UNIT – 3 Angle Modulation

Introduction, Mathematical analysis of FM and PM, Modulation index for FM and PM, Frequency spectrum and bandwidth of FM, Narrow band and wide band FM, Direct and indirect methods of FM generation, Pre emphasis and de-emphasis, Comparison of AM, FM and PM.

UNIT – 4 Radio Receivers and Demodulators

Introduction, Performances characteristic of receivers: Sensitivity, Selectivity, Fidelity, Image frequency and IFRR, Tracking and Double spotting, TRF, Super heterodyne receivers, RF amplifier, Local oscillator and mixer, IF amplifier, AGC.

UNIT – 5 AM and FM Detectors and noise

AM Detectors: Envelop detector and practical diode detector.

FM Detectors: Slope detector, phase discriminator and ratio detector.

Noise: Introduction, Sources of noise, Classification of noise, Noise calculations (thermal noise), SNR, Noise figure, Noise Factor, Noise Temperature.

TEXT/REFERENCE BOOKS:

- 1. Kennedy, "Electronics Communications Systems", McGraw-Hill New Delhi-1997, 4th Edition.
- 2. Anokh Singh, "Principles of communication engineering"S.Chand
- 3. Roddy&Coolen, "Electronic communication"PHI
- 4. Taub & Schilling "Principles of communication systems" Tata Mc GrawHill
- 5. Beasley & Miller, "Modern Electronic Communication", Prentice-Hall India-2006, 8th Edition.
- Wayne Tomasi, "Electronic Communication Systems", Pearson Education-2005, 5th Edition. R. G. Gupta, "Audio & Video Systems" Tata McGraw-Hill NewDelhi-2008

07 Hours

07 Hours

07 Hours

07 Hours

07 Hours

Course Objectives

- 1. To introduce the concepts of analog communication systems.
- 2. To equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance.
- 3. To understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase)

Course Outcomes

After successfully completing the course students will be able to

- 1. Understand and identify the fundamental concepts and various components of analog communication systems.
- 2. Understand the concepts of modulation and demodulation techniques.
- 3. Design circuits to generate modulated and demodulated wave.
- 4. Equip students with various issues related to analog communication such as modulation, demodulation, transmitters and receivers and noise performance.
- 5. Understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase).
- 6. Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.
- 7. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.

Program Outcomes

- 1. The graduates will possess the knowledge of differential equations, vector calculus, complex variable, matrix theory, probability theory, physics, chemistry and electrical & electronics engineering
- The graduate will demonstrate an ability to identify, formulate and solve Electronics & Telecommunication engineering problems
- 3. The graduates will have an ability to design electronic circuits and systems, analyze and interpret data.
- 4. The graduates will have an ability to design digital and analog systems and components
- 5. The graduates will possess the knowledge of advanced and emerging topics in the fields of Electronics, Signal Processing and Communication
- 6. The graduates will demonstrate the skills to use modern engineering tools, software and equipment's to analyze and solve real-life problems
- 7. The graduate will have broad understanding of the impact of Electronics and Telecommunication field in economic, environmental and social context and also will be aware of the contemporary issues
- 8. The graduates will possess communication skills necessary to communicate engineering ideas. The skills set include verbal, written and listening skills.
- 9. The graduates will demonstrate the ability to work and collaborate in heterogeneous teams.
- 10. The graduates will demonstrate the awareness of professional and ethical responsibilities
- 11. The graduates will develop self-confidence and ability for lifelong learning.

Course Outcomes and Program Outcomes Mapping Table

Academic Calendar for 2022-2023



डॉ. बाबासाहेब आंबेडकर तंत्रशास्त्र विद्यापीठ, लोणेरे

Dr. Babasaheb Ambedkar Technological University, Lonere (Established under Act No XXIX of 2014 by government of Maharashtra) विद्याविहार, लोणेरे-रायगड ४०२ १०३ (महाराष्ट्र) Vidyavihar, Lonere - Raigad 402 103 (Maharashtra) Tel: (02140) 275142 क्वर Student Helpline: 02140-275212

Website: www.dbatu.ac.in, E-mail: registrar@dbatu.ac.in

Dr. Bhagwan F. Jogi Registrar

डॉ. भगवान फ. जोगी कुलसचिव

Dated:12/ 08/2022

SL No.	Activity	Commencement Date	Concluding Date	Total Days	Engineering
1	Admissions: B.Tech. Second, Third and Final Year; M.Tech. Second year.	September 01, 2022	September 10, 2022	10	UG and PG
2	Commencement of Classes of Second, Third and Final Year	September 01, 2022	December 19, 2022	110	UG and PG
3	Dissertation Examination of the Academic Year 2021-2022	September 01, 2022	September 10, 2022	10	PG
4	Mid-Semester Examinations	October 12, 2022	October 21, 2022	09	UG and PG
5	Submission of Dissertation Proposal to University	October 18, 2022	October 21, 2022	04	PG
6	Display of Mid-Semester Examination Marks	October 28, 2022	October 31, 2022	04	UG and PG
•7	Scrutiny of Master's Level Dissertation Work Proposal	November 01, 2022	November 03, 2022	03	PG
8	Exam Form Filling for Regular & Supplementary Examinations	November 01, 2022	November 08, 2022	08	UG and PG
9	Exam Form Filling for Regular & Supplementary Examinations with Late Fee	November 09, 2022	November 15, 2022	07	UG and PG
10	University Tech Fest 2021	November 17, 2022	November 19, 2022	03	UG and PG
11	End of Classes		December 19, 2022	110	UG and PG
12	Practical/Project/Seminar Examinations	December 20, 2022	December 23, 2022	04	UG and PG
13	Uploading Internal, Mid Semester, Practical, Project and Seminar marks on University portal	December 22, 2022	December 24, 2022	03	UG and PG
14	End Semester Regular & Supplementary Examination	December 26, 2022	January 21, 2023	26	UG and PG
15	Internship/Industrial Training#				
16	Vacation	January 1, 2023	January 20, 2023	20	Faculty and Staff

Academic Calendar 2022-23 (Odd Semester) (Engineering)



17	Commencement of Classes	February 1, 2023	May 31, 2022	120	UG and PG
18	Remedial Examination	February 21, 2023	March 3,2023	10	UG and PG

#Industrial training will be carried out after completion of odd semester or in the staggered manner in the period of entire odd semester (Preferably on Saturdays, Sundays and Holidays) and partially in the vacation after odd semester. Another option could be permit the training in online mode which is not less than 120 hours.

Table 2 : List of Festivals / Holidays

SL No.	Festivals / Holidays	Date
1	Dasara	Wednesday, 05 October, 2022
2	Diwali Laxmi Pujan	Monday, 24 October, 2022
3	Diwali Balipratipada	Wednesday, 26 October, 2022
4	Guru Nanak Jayanti	Tuesday, 08 November, 2022

Table 3 : Following Holidays fall on Sunday

SL No.	Festivals / Holidays	Date
1	Mahatma Gandhi Jayanti	02 October, 2022
2	Id-E-Milad	09 October, 2022
2	Christmas	25 December, 2022

12.08.2022

(Dr. B. F. Jogi) Registrar

Dr. Babasaheb Ambedkar Technological University, Lonere

Dr. Babasaheb Ambedkar Technological University, Lonere Department of Electronics and telecommunication Engineering

Subject: Computer Network Class: Final Year Pre-requisite: Mathematics Subject Code: EC41A Semester: VI Faculty: Ms. M. R.Mehta

End sem Paper- 60 marks

Marking Scheme

CA1, CA2 = 10 Marks Mid-Sem = 20 marks

Reference /Text book:

- 1. Kennedy, "Electronics Communications Systems", McGraw-Hill New Delhi-1997, 4th Edition.
- 2. Anokh Singh, "Principles of communication engineering"S.Chand
- 3. Roddy&Coolen, "Electronic communication"PHI
- 4. Taub & Schilling "Principles of communication systems" Tata Mc GrawHill
- 5. Beasley & Miller, "Modern Electronic Communication", Prentice-Hall India-2006, 8th Edition.
- Wayne Tomasi, "Electronic Communication Systems", Pearson Education-2005, 5th Edition. R. G. Gupta, "Audio & Video Systems" Tata McGraw-Hill NewDelhi-2008

UNIT	CHAPTER	LECT	TOPICS
NO.	NAME	NO.	
		1	Data communications, type of networks
		2	Protocol & Standards
		3	The OSI model, TCP/IP suite
	Physical	4	Addressing schemes, data & signals
1	Layer	5	Transmission impairments, transmission media
		6	Data rate limits digital to digital conversion,
		7	Transmission modes
		8	Switching techniques
		9	Error detection & correction block coding
		10	Cyclic codes, checksum
		11	Data link layer design issues,
	Data Link	12	Protocols for noiseless & noisy channels
П	Layer	13	Random Access, Controlled Access
		14,15	Connecting Devices: Passive Hubs, Repeaters, Active Hubs, Bridges
		16,17	Connecting Devices: Routers, Two/Three Layer Switches And Gateways
		18	Concept of datagram & VC
ш	Networ	19	ICMP, IGMP, Delivery
	kLayer	20	Forwarding, Unicast
		21	Multicast Routing Protocols
IV	Transport	22	Process to Process Delivery

	Layer	23	UDP, TCP
		24	Data Traffic, Congestion Control,
		25	QoS, Techniques to improve QoS,
		26	Integrated Services
		27	Name Space, DNS, Distribution Of Name Space, ,
	Application	28	Application Layer
V	Application Layer	29	Resolution, DNS In Internet
	Layer	30	Telnet, Ftp
		31	E-Mail
		32	Introduction
	Network	33	Systematic & Asystematic Key Cryptography
VI	Networ	34	Security Services
	k Security	35	Digital Signature
	Security	36	Entity Authentication
		37	Key Management

TIME-TABLE

Department of Electronics & Telecommunication Engineering

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		N-III		EM-III[104]	DE(NSJ)[104]			EDC(JSK)[106]		DE[A](KSK)	DE[A](KSK)/EDC[B](RKB)
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Vit Vit<		N-A		DSP(SLN)[101]	EMFT(SBD)[101]	CSE(RKB)[101]	⇒ :	DSP[A](PPI)/A(COMM[B](TUM)		
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Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE. Department of Electronics & Telecommunication Engineering

Question Bank AY 2022-23

Assignment on Unit-1

- Q. 1 Define Communication and Explain the Analog communication system.
- Q.2 Write the difference between Analog communication and Digital communication
- Q.3 Explain the different modes of transmission .
- Q.4 Explain different types of communication
- Q. 5 What is modulation ? What is need of modulation ?
- Q.6 What are the advantages of using Modulation ?
- Q.7 Give the classification Modulation
- Q.8 What is sampling Theorem ?
- Q.9 Write the difference between FDM and TDM
- Q.10 Draw the Electromagnetic Spectrum in the terms of frequency range
- Q. 11 define:
- A Wavelength
- B bandwidth
- C Baseband Signal
- D Carrier signal
- E Message signal

Assignment on Unit-3

- Q. 1 Define Communication and Explain the Angle Modulation
- Q.2 What is modulation ? Derive the expression for Modulation index for FM
- Q.3 What is modulation ? Derive the expression for Modulation index for PM
- Q.4 Explain Narrow band and wide band FM
- Q. 5 Derive the expression for PM wave
- Q. 5 Derive the expression for FM wave
- Q.6 Explain the frequency spectrum for FM wave.
- Q. 7 Explain the Carsons rule

Q.8 1. A 500-Hz modulating voltage fed into a PM generator produces a frequency deviation of 2.25 kHz. What is the modulation index? If the amplitude of the modulating voltage is kept constant, but its frequency is raised to 6 kHz, what is the new deviation?

Q.9 When the modulating frequency in an FM system is 400 Hz and the modulating voltage is 2.4 V, the modulation index is 60. Calculate the maximum deviation. What is the modulating index when the modulating frequency is reduced to 250 Hz and the modulating voltage is simultaneously raised to 3.2 V?

Q.10. The equation of an angle-modulated voltage is $v = 10 \sin (W8t + 3 \sin I04t)$. What form of angle modulation is this? Calculate the carrier and modulating frequencies, the modulation index and deviation, and the power dissipated in a 100-0 resistor.

Q.11. The center frequency of an LC oscillator, to which a capacitive reactance FET modulator is connected, is 70 MHz. The FET has a gm which varies linearly from 1 to 2 mS, and \cdot a bias capacitor whose reactance is 10 times the resistance of the bias resistor. If the fixed tuning capacitance across the oscillator coil is 25 pF, calculate the maximum available frequency deviation.

Q.12. An RC capacitive reactance modulator is used to vary the frequency of a IO-MHz oscillator by \pm 100 kHz. An FET whose transconductance varies linearly with gate voltage from Oto 0.628 mS, is used in conjunction with a resistance whose value is one-tenth of the capacitive reactance used. Calculate the inductance and capacitance of the oscillator tank circuit.

ALL THE SOLVED PROBLEMS FROM KENNEDY CHAPTER 4

Assignment on Unit-3

1-2 Marks Questions:

Q.1 Define the following terms -

- a) Hub
- b) Switch
- c) Router
- d) Bridge
- e) Gateway
- f) Repeater
- g) Ethernet
- h) Bluetooth
- i) Virtual LAN

Q.2 Compare the following networking devices -

- a) Hub and Switch
- b) Router and Bridge
- c) Router and Switch
- d) Hub and Bridge

5 -7 Marks Questions:

- Q.1 Explain the following networking devices in detail
 - a) Switch
 - b) Router
 - c) Bridge
 - d) Gateway
 - e) Repeater
 - f) Hub

Q.2 Write a note on

- a) Standard Ethernet
- b) Fast Ethernet
- c) Gigabit Ethernet
- d) 10-Gigabit Ethernet
- e) IEEE 802.11 Standards
- f) Virtual LANs

Assignment on Unit-4

Questions:

- 1. What are the responsibilities of Network Layer?
- 2. Write Short Note on
 - a) IPV4 Addressing
 - b) IPV6 Addressing
 - c) Routing Table
- 3. What are the types of class full addressing? And Function of each class address
- 4. Define : Netid and Hostid
- 5. Define : Subnetting and Supernetting
- 6. What is Default masks for class A, B, C addressing
- 7. What is need for Classless addressing
- 8. What is the need for IPV6 Addressing
- 9. Discuss the Address Resolution Protocol.
- 10. Discuss the Reverse Address Resolution Protocol.
- 11. Change the following IPv4 addresses from binary notation to dotted-decimal notation.
 - a. 10000001 00001011 00001011 11101111
 - b. 11000001 10000011 00011011 1111111
- 12. Change the following IPv4 addresses from dotted-decimal notation to binary notation.

- a. 111.56.45.78b. 221.34.7.82
- 13. Find the error, if any, in the following IPv4 addresses.
 - a) 111.56.045.78
 - b) 221.34.7.8.20
 - c) 75.45.301.14
 - d) 11100010.23.14.67

14. Find the class of the following IP addresses.

- a) 208.34.54.12
- b) 238.34.2.1
- c) 114.34.2.8
- d) 129.14.6.8

15. Find the netid and the hostid of the following IP addresses.

a. 114.34.2.8b. 132.56.8.6c. 208.34.54.12

16. A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28.

- a. What is the first address in the block?
- b. Find the last address for the block
- c. Find the number of addresses

17. Find the sub network address and the host-ID for the following

- a. IP Address 120.14.22.16 & Mask- 255.255.128.0
- b. IP Address 140.11.36.22 & Mask- 255.255.255.0
- c. IP Address 141.181.14.16 & Mask- 255.255.224.0
- d. IP Address 200.34.22.156 & Mask- 255.255.250.240

18. In a block of addresses, we know the IP address of one host is 25.34.12.56/16. What are the first address (network address) and the last address (limited broadcast address) in this block?

19. In a block of addresses, we know the IP address of one host is 182.44.82.16/26. What are the first address (network address) and the last address in this block?

20. An ISP is granted a block of addresses starting with 190.100.0.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows:

- a. The first group has 64 customers; each needs 256 addresses.
- b. The second group has 128 customers; each needs 128 addresses.
- c. The third group has 128 customers; each needs 64 addresses.

Design the sub-blocks and find out how many addresses are still available after these allocations.

21. An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows.

- a. The first group has 200 medium-size businesses; each needs 128 addresses.
- b. The second group has 400 small businesses; each needs 16 addresses.
- c. The third group has 2000 households; each needs 4 addresses.

Design the sub-blocks and give the slash notation for each subblock. Find out how many addresses are still available after these allocations.

Assignment on Unit-5

Questions:

- 1. What are the responsibilities of Transport Layer?
- 2. Compare the TCP AND UDP
- 3. The UDP header in hexadecimal format is as : BC82000D002B001D Obtain the following from it:
 - 1. Source port number
 - 2. Destination port number
 - 3. Total length
 - 4. Length of the data.
 - 5. Name of client process.
- 4. The UDP header in hexadecimal format is as : CB84000D001C001C Obtain the following from it:
 - 1. Source port number
 - 2. Destination port number
 - 3. Total length
 - 4. Length of the data.
 - 5. Name of client process
- 5. The UDP header in hexadecimal format is as : 0045000D0058FE20 Obtain the following from it

 - 1. Source port number 2. Destination port number
 - 3. Total length
 - 4. Length of the data.
 - 5. Name of client process
- 6. The UDP header in hexadecimal format is as : 0632000D001CE217 Obtain the following from it:
 - 1. Source port number

- 2. Destination port number
- 3. Total length
- 4. Length of the data.
- 5. Name of client process
- 7. Write short notes on
 - a. TCP
 - b. UDP

Assignment on Unit-6

Write Short Note on following:

- a. Domain Name Space (DNS)
- b. DDNS
- c. TELNET
- d. EMAIL
- e. File Transfer Protocol (FTP),
- f. WWW
- g. HTTP
- h. Firewalls

CA1 & CA2 Evaluation Criteria

Test →	CA2
Criteria	Marks allocated for assignments
Assignment1	3
Assignment2	3
Assignment3	4
Assignment4	
Assignment5	
Assignment6	

i. ** Correct answering of tricky questions answered during regular classes is also considered for CA1 and CA2 evaluation. Those who answered questions correctly are considered for 1 or 2 extra marks in addition to the marks obtained after assignment completion.

CA -1 (Analog communication)

- 1. Explain all blocks of Analog communication system. (5M)
- Derive the expression for modulation index in terms of (i)Vm and Vc (ii)Vamx and Vmin for DSBFC wave (5M)
- 1. What is need of modulation ? (5M)
- 2. Derive the expression for modulation index in terms of (i)Vm and Vc (ii)Vamx and Vmin for DSBFC wave (5M)

Question Papers AY 2022-23

Dr. Babasaheb Ambedkar Technological University, Lonere-Raigad. Department of Electronics and Telecommunication Engineering Subject: BTETC503 Analog Communication Semester: VI Date: 31/10/2022 Time: 2:30 to 3:30 Max. Marks: 20 Q.1 What is modulation? What is need of modulation? (5M) Explain the process of generation of SSB using the phase shift method. 0.2 (5M) An AF signal $v_m = 20 \sin (2\pi x 500t)$ is used to amplitude modulate a carrier of Q.3 (5M) $v_c = 50 \sin (2x10^5 t)$ Calculate: (a) Modulation index (b) Sideband frequencies (c) Amplitude of each sideband frequency (d) Bandwidth required (e) Total power delivered into a load of 600. 0.4 A 400 W carrier is amplitude modulated to a depth of 100%. Calculate the total (5M) power in case of (a) SSB technique? (b) VSB technique if 20% of the other sideband is transmitted along with wanted sideband. How much more power (in

W) is required for VSB compared to SSB?

End of the Question Paper

	Dr. Babasaheb Ambedkar Technological Universit	,	
	DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LO	INERE	
	Regular End Semester Examination – Winter 2023		
	Course: B. Tech. Branch : E & T C Semester	: V	
	Subject Code & Name: BTETC503 - Analog Communication Engineering		
	Max Marks: 60 Date: Duration: 3.	45 Hr.	
	 Instructions to the Students: All the questions are compulsory. The level of question/expected answer as per OBE or the Course Outce the question is based is mentioned in () in front of the question. Use of non-programmable scientific calculators is allowed. Assume suitable data wherever necessary and mention it clearly. 		
). 1		(Level/CO)	Mark
κ. 1 Α)	Answer Any Two of the following.		
А) В)			6
		CO 01	6
C)	Write the difference between i)FDM and TDM ii) Analog communicatior Digital communication	n and CO 01	6
Q.2	Answer Any Two of the following.		
A)	Explain DSBFC Technique in detail with the help of (i) frequency spectrum (ii) domain representation (iii) power relation with carrier wave	Time CO 02	6
B)	Calculate the percentage power saving when the carrier and one of the side are suppressed in an AM wave modulated to the depth of (i) 70% and (ii) 65%		6
C)	Explain generation of AM using Nonlinear resistance device	CO 03	6
). 3	Answer/Solve Any Two of the following.		
A)	What is Angle modulation? Derive the mathematical expression for PM.	CO 05	6
B)	Explain Narrowband and Wideband FM Also compare the FM and AM.	CO 05	6
C)	In an FM system, when the audio frequency (AF) is 500 Hz, and the AF volta 2.4 V, the deviation is 4.8 kHz. If the AF voltage is now increased to 7.2 V, w the new deviation? If the AF voltage is further raised to 10 V while the dropped to 200 Hz, what is the deviation? Find the modulation index in each	hat is AF is	6
	Answer the following.		
Q.4		CO 07	6
ξ.4 Α)	Define:		-

	B)	Explain working of Superheterodyne receiver in detail.	CO 04	6
Q. 5		Solve the following.		
	A)	Two resistors 20 k Ω and 50 k Ω are at room temperature (290 K). Calculate for bandwidth of 100 KHz, the thermal noise for the following conditions:	CO 04	8
		(i) For resistor 20 kΩ		
		(ii) For resistor 50 kΩ		
		(iii) For two resistors in series		
		(iv) For two resistors in parallel.		
	B)	An amplifier operating over the frequency range from 3 to 10MHz has a 20K input resistance. What is the rms noise voltage at the input to this amplifier at room temperature?	CO 04, 06	4
		*** End ***		

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Student Attendance

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35 Schlitt, SkADAM T2030331372031 Albert	35 Ahlil. Sk. A.DAM 7203331372037 7.00	The second		4 RUSHIKESH S DHADE	T2030331372035			AB	+		5	HOWY .		RUBM			Ruen
36 MMIK SAHL M T203031372038 MM MP Com Com </td <td>36 MMK SAHL M T203031372038 M<th></th><td></td><td>5 SAHIL S KADAM</td><td>T2030331372037</td><td></td><td></td><td>Rhade</td><td></td><td>A AB</td><td>Photo</td><td>En al</td><td></td><td>-</td><td>1</td><td>TOP</td><td>Reday</td></td>	36 MMK SAHL M T203031372038 M <th></th> <td></td> <td>5 SAHIL S KADAM</td> <td>T2030331372037</td> <td></td> <td></td> <td>Rhade</td> <td></td> <td>A AB</td> <td>Photo</td> <td>En al</td> <td></td> <td>-</td> <td>1</td> <td>TOP</td> <td>Reday</td>			5 SAHIL S KADAM	T2030331372037			Rhade		A AB	Photo	En al		-	1	TOP	Reday
37 Shill SDIVEKAR T203031137001 Anile Studen Stude Studen Studen Stude Studen Studen Stude Studen Studen Studen Stu	37 Shill. SDIVEKAR T20303137203 Optimized Struigen St	je je		6 NAIK SAHIL M	T2030331372038	11	>	AB	AN	Æ	- ANA	(Jener	Carrie	0		Same	
38 SAKSHI S KAASKAR T2030331372041 A	38 SAKSHI S KALASKAR T03031137041 T <t< td=""><th>Berek</th><td>in B</td><td>7 SAHIL S DIVEKAR</td><td></td><td></td><td>Dine</td><td>S</td><td>+</td><td></td><td>1</td><td>Spin et</td><td>Spina</td><td></td><td>Compan</td><td>(Spinely)</td><td>Con lev</td></t<>	Berek	in B	7 SAHIL S DIVEKAR			Dine	S	+		1	Spin et	Spina		Compan	(Spinely)	Con lev
39 SAMBHAI A BANSODE- T203031372042 ***	39 SAMBHAI A BANGDE- T2030331372042 * **** **** *** ****		35	8 SAKSHI S KALASKAR			K	3TK	1		1	-cw	Control of	1	Makin?		Mallur
10 CHANDORKAR SAMIDHAN T203031372043 1 CHANDORKAR SAMIDHAN T203031372043 2 Annual Ann	00 CHANDORKAR SAMIDHAN T203031372043 CHANDORKAR SAMIDHAN T203031372043 CHANDORKAR SAMIDHAN T203031372043 CHANDORKAR SAMIDHAN T203031372044 CHANDORKAR SAMIDHAN T2030331372045 CHANDORKAR SAMIDHAN T2030331372055 CHANDORKAR SAMIDHAN T2030331372055 CHANDORKAR SAMIDHAN CHANDORKAR SAMIDHAN <thchandorkar samidhan<="" th=""></thchandorkar>	E	Les ales	9 SAMBHAJI A BANSODE -	T2030331372042		-	at a	SB CB	A.A	Burn	Due of	- COLOR	Bend.	-Anulo	1 1	Baur -
41 SAMIKSHA V DHEPE 72030331372044 Ange Ane Ane	11 SAMIKSHA V DHEPE T203031372044 Rept. Rep. Rep. Rept. <th>(Complete State</th> <td></td> <td>0 CHANDORKAR SAMIDHA N</td> <td>T2030331372043</td> <td></td> <td></td> <td></td> <td>STA 1</td> <td>ALL ON A</td> <td>Hanner H</td> <td></td> <td>A DIMEN</td> <td>-</td> <td>1</td> <td>Contract</td> <td></td>	(Complete State		0 CHANDORKAR SAMIDHA N	T2030331372043				STA 1	ALL ON A	Hanner H		A DIMEN	-	1	Contract	
42 SAMRUDDHIR NAIK T2030331372045 A Paolu Faolu Faolu <td>42 SAMRUDDHI R NAIK T2030331372045 A Fault Fault<!--</td--><th></th><td></td><td>I SAMIKSHA V DHEPE</td><td>T2030331372044</td><td></td><td>1</td><td>Bhen</td><td>Cancer</td><td>0</td><td>River</td><td></td><td>1</td><td></td><td>Shere</td><td>Shell</td><td>1.1</td></td>	42 SAMRUDDHI R NAIK T2030331372045 A Fault Fault </td <th></th> <td></td> <td>I SAMIKSHA V DHEPE</td> <td>T2030331372044</td> <td></td> <td>1</td> <td>Bhen</td> <td>Cancer</td> <td>0</td> <td>River</td> <td></td> <td>1</td> <td></td> <td>Shere</td> <td>Shell</td> <td>1.1</td>			I SAMIKSHA V DHEPE	T2030331372044		1	Bhen	Cancer	0	River		1		Shere	Shell	1.1
43 SarAH A HASWARE 720331372046 2 45 45 44 40.0 M 45.0 M <	43 SRAHA HASWARE T2030331372046 2 4 4 2 4 2 4 4 2 4 4 2 4 4 4 4	Mich		2 SAMRUDDHI R NAIK	T2030331372045		- 4	Flour	-	1	1		-		Prolut	V	W
44 SURABH S PACHILING T2030331372049 M M T	44 SURABH S PACHILING 720331372049 A <	Bulue	T	3 SARAH A HASWARE	T2030331372046		A	AB	-8	Æ	Barre	Balwe	- (galand	Salut	0	Ball	(golut
45 SEJAL V KARDE T2030331372050 ADS	45 SEIAL V KARDE T2030331372050 AB	-	4	4 SAURABH S PACHILING	T2030331372049		_	A	eb.	AB	d'	A	AB.	1.	Frit	2	R R R R R R R R R R R R R R R R R R R
46 SHIVANI H KOLI T2030331372051 >	46 BHIVANI H KOLI T203031372051 > -H-koni S-H-koni S-	Alach	4	5 SEJAL V KARDE	T2030331372050			AB				1.	AB	- Hault	Konel.	Start.	stall
47 SHIVARAJ V DASARWAR T203031372052 Z W MS	47 SHIVARAJ V DASARWAR T203031372052 Z W MS	0		6 SHIVANI H KOLI	T2030331372051	- 8	-	3.H.KC	S	S			So Hikoli	SIMIKON	Sitter		
48 SNEHA V AAHER T2030331372053 SWADER	48 SNEHA V AHER T2030331372053 SMADE SWADE SWADE </td <th>Alice</th> <td>4</td> <td>7 SHIVARAJ V DASARWAR</td> <td>T2030331372052</td> <td>H</td> <td>7</td> <td>AB</td> <td>AB</td> <td>AB</td> <td>Anne</td> <td>Amol.</td> <td>Celonor</td> <td>A8</td> <td>AB</td> <td>Sound</td> <td>Reit</td>	Alice	4	7 SHIVARAJ V DASARWAR	T2030331372052	H	7	AB	AB	AB	Anne	Amol.	Celonor	A8	AB	Sound	Reit
49 SONALI V MORE T2030331372054 1 MS 4 <td< td=""><td>49 SONALI V MORE T2030331372054 N MS A B A A A A A A B <th< td=""><th>SURM</th><td>45</td><td>8 SNEHA V AAHER</td><td>T2030331372053</td><td>-</td><td>SWArh</td><td>SN</td><td>er S.V. Anhei</td><td></td><td></td><td></td><td>S.V. Achor</td><td>S' Adhen</td><td></td><td></td><td>S.V. Acher</td></th<></td></td<>	49 SONALI V MORE T2030331372054 N MS A B A A A A A A B <th< td=""><th>SURM</th><td>45</td><td>8 SNEHA V AAHER</td><td>T2030331372053</td><td>-</td><td>SWArh</td><td>SN</td><td>er S.V. Anhei</td><td></td><td></td><td></td><td>S.V. Achor</td><td>S' Adhen</td><td></td><td></td><td>S.V. Acher</td></th<>	SURM	45	8 SNEHA V AAHER	T2030331372053	-	SWArh	SN	er S.V. Anhei				S.V. Achor	S' Adhen			S.V. Acher
50 SONALI S DALVI T2030331372055 MS	50 SONALIS DALVI T2030331372055 MS	Achen 6	4	9 SONALI V MORE	T2030331372054		K	AB	V	4	A HOLE	(HIMORE)		-THUNNING	AB	Aller	A WINTE
51 RUSHTI R LOKHANDE T2030331372056 MB	51 RUSHTI R LOKHANDE T2030331372056 Main	tore		0 SONALI S DALVI	T2030331372055		_	AND			65 Saluri	A A A A	1.	AB		1	as any
52 SURVAPRAKASH PSHENDGI T2030331372058 2 M 4 M 4 M 4 M 4 M 4 M 4 M 4 M 4 M 4 M 4 M 4 M 4 M 4 M <t< td=""><td>52 SUKAPRAKASH P SHENDGI T2030331372058 2 M M <t< td=""><th>QLa La Da</th><td>25</td><td></td><td>T2030331372056</td><td></td><td></td><td>AB</td><td></td><td></td><td>elatede</td><td>- CARING</td><td>el Blox</td><td>REAMOR</td><td>V</td><td>1</td><td></td></t<></td></t<>	52 SUKAPRAKASH P SHENDGI T2030331372058 2 M M <t< td=""><th>QLa La Da</th><td>25</td><td></td><td>T2030331372056</td><td></td><td></td><td>AB</td><td></td><td></td><td>elatede</td><td>- CARING</td><td>el Blox</td><td>REAMOR</td><td>V</td><td>1</td><td></td></t<>	QLa La Da	25		T2030331372056			AB			elatede	- CARING	el Blox	REAMOR	V	1	
53 TANAY A SALUNKE T2030331372059 Z M3 M3 M9	53 TANAY A SALUNKE T2030331372059 X MB W MB	100	57	2 SURYAPRAKASH P SHENDGE	T2030331372058		-8	W	-8	- 0	Flath :	- Apople	A and	- Cart	And a	Starter	And .
54 Sarrah Baden T203033137264 MBroken MB Haden MB Haden AB Haden AB Haden AB Haden AB	54 Sarrah Badan T2030331372062 AB Alladen AB Alladen AB Alladen AB Alladen AB Alladen AB Alladen Abder AB	de		3 TANAY A SALUNKE	T2030331372059		N	SA S	₩.	H	AB	AD,	AB	proper.		4.	terre
AB AB AB	V V AB AB	A Bad	SY	4 Sarah Badar	T2030331372047		-	ABoolo		+	Alader	SS.	#Baden	AB	Ban	dar	# Salor
			55					A3		_	AB		l				
			56	9		A	7	er	b	7	AB						

Student Performance

Sr.	ROLL NUMBER	MID-SEM MARKS(20)	CA1	CA2	TOTAL
1	1930331372001	12	9	9	30
2	1930331372002	13	9	9	31
3	1930331372003	15	9	9	33
4	1930331372004	15	9	9	33
5	1930331372005	16	9	8	33
6	1930331372006	18	9	9	36
7	1930331372007	14	9	8	31
8	1930331372008	15	9	8	32
9	1930331372010	6	7	9	22
10	1930331372011	6	8	8	22
11	1930331372012	15	7	9	31
12	1930331372013	14	9	9	32
13	1930331372014	10	9	9	28
14	1930331372015	14	9	8	31
15	1930331372016	7	7	8	22
16	1930331372031	9	6	8	23
17	1930331372032	9	8	9	26
18	1930331372033	11	8	9	28
19	1930331372053	10	7	9	26
20	1930331372054	10	9	9	28
21	1930331372055	14	9	9	32
22	1930331372056	9	9	9	27
23	1930331372058	11	9	9	29
24	1930331372060	8	9	9	26
25	1930331372061	10	9	9	28
26	1930331372063	10	9	9	28
27	1930331372064	7	9	9	25
28	1930331372065	7	7	9	23
29	1930331372066	14	9	8	31
30	1930331372067	12	7	9	28
31	1930331372068	9	9	9	27
32	1930331372069	14	9	9	32
33	1930331372076	10	9	9	28
34	1930331372077	10	9	9	28
35	1930331372078	12	9	9	30
36	1930331372081	17	9	9	35
37	1930331372082	14	7	9	30
38	1930331372083	12	8	8	28
39	1930331372084	11	9	9	29
40	1930331372087	10	7	9	26
41	1930331372088	1	9	9	19
42	1930331372090	2	9	8	19
43	1930331372091	13	7	8	28
44	1930331372093	8	9	9	26
45	1930331372094	AB	AB	AB	AB
46	1930331372096	4	8	9	21
47	1930331372098	11	7	9	27

48	1930331372099	10	7	8	25
49	1930331372100	12	7	9	28
50	1930331372102	16	9	9	34
51	1930331372103	11	8	9	28
52	1930331372104	13	9	9	31
53	1930331372105	7	4	8	19
54	1930331372106	4	7	8	19
55	1930331372107	9	8	8	25
56	1930331372108	14	7	9	30
57	1930331372109	8	8	9	25
58	1930331372111	11	8	8	27
59	1930331372112	19	7	8	34
60	1930331372115	9	7	8	24
61	1930331372116	9	9	8	26
62	1930331372117	10	9	9	28
63	103033201811372 10074	7	0	0	7
64	103033201811372 10129	4	7	8	19
65	2030331372001	12	9	8	29
66	2030331372002	16	6	8	30
67	2030331372003	12	7	8	27
68	2030331372004	10	8	8	26
69	2030331372005	18	9	9	36
70	2030331372006	9	9	9	27
71	2030331372007	8	8	9	25
72	2030331372008	6	9	9	24
73	2030331372009	10	7	8	25
74	2030331372010	19	7	8	34
75	2030331372011	8	8	8	24
76	2030331372012	7	8	8	23
77	2030331372013	9	8	8	25
78	2030331372014	9	7	8	24
79	2030331372015	12	9	8	29
80	2030331372016	7	8	9	24
81	2030331372017	6	9	8	23
82	2030331372018	9	4	8	21
83	2030331372019	11	7	8	26
84	2030331372020	6	9	8	23
85	2030331372021	6	9	8	23
86	2030331372022	9	9	9	27
87	10303320171137213015	AB	AB	AB	AB

Assessment of Course Outcomes through MSE

MSE Question Numbers	Q.1 /5	Q.2 /5	Q.3/5	Q.4 / 5	Q.5/5
Relevant Course Outcomes	CO1, CO2	CO1, CO3,CO2	CO1, CO5, CO2,CO6	CO1,CO6,CO5	C01,C03,C02,C05
Enrollment Number					
1930331372001	4	NA	2	4	2
1930331372002	4	NA	3	4	2
1930331372003	4	4	NA	4	3
1930331372004	4	NA	3	4	4
1930331372005	4	NA	4	4	4
1930331372006	4	5	NA	5	4
1930331372007	4	NA	2	4	4
1930331372008	4	3	NA	4	4
1930331372010	2	NA	NA	3	1
1930331372011	3	NA	NA	2	1
1930331372012	4	3	NA	4	4
1930331372013	4	NA	2	4	4
1930331372014	4	NA	NA	3	3
1930331372015	4	NA	2	4	4
1930331372016	2	NA	NA	3	2
1930331372031	3	NA	NA	3	3
1930331372032	3	NA	NA	3	3
1930331372033	4	NA	NA	4	3
1930331372053	4	NA	NA	3	3
1930331372054	4	NA	NA	3	3
1930331372055	4	3	NA	4	3
1930331372056	3	NA	NA	3	3
1930331372058	4	2	NA	3	2
1930331372060	2	2	NA	2	2
1930331372061	3	2	NA	3	2
1930331372063	3	NA	2	3	2
1930331372064	2	1	NA	2	2
1930331372065	2	2	NA	2	1
1930331372066	4	NA	2	4	4
1930331372067	4	NA	NA	4	4

1930331372068	3	3	NA	3	NA
1930331372069	4	3	NA	4	3
1930331372076	3	NA	1	3	3
1930331372077	4	NA	NA	3	3
1930331372078	4	2	NA	4	2
1930331372081	4	4	NA	5	4
1930331372082	4	2	NA	4	4
1930331372083	4	NA	NA	4	3
1930331372084	4	NA	NA	4	3
1930331372087	4	1	NA	3	2
1930331372088	1	NA	NA	NA	NA
1930331372090	1	NA	NA	1	NA
1930331372091	4	NA	1	4	4
1930331372093	2	2	NA	3	1
1930331372096	2	NA	NA	2	NA
1930331372098	4	NA	NA	4	3
1930331372099	4	NA	NA	3	3
1930331372100	4	1	NA	4	3
1930331372102	4	4	NA	4	4
1930331372103	4	NA	NA	4	3
1930331372104	4	2	NA	4	3
1930331372105	3	NA	NA	3	1
1930331372106	2	NA	NA	2	NA
1930331372107	3	NA	1	3	2
1930331372108	4	NA	2	4	4
1930331372109	3	0	0	3	2
1930331372111	4	NA	NA	4	3
1930331372112	4	5	NA	5	5
1930331372115	3	NA	NA	3	3
1930331372116	3	NA	NA	3	3
1930331372117	4	NA	2	4	NA
103033201811372 10074	3	NA	1	2	1
103033201811372 10129	2	NA	NA	2	NA
2030331372001	4	NA	NA	4	4
2030331372002	4	4	NA	4	4
2030331372003	4	NA	1	4	3
2030331372004	3	2	NA	3	2
2030331372005	4	4	NA	5	5
2030331372006	3	1	NA	3	2
2030331372007	3	NA	2	3	NA
2030331372008	2	1	NA	3	NA

2030331372009	3	1	NA	3	3
2030331372010	4	NA	5	5	5
2030331372011	2	NA	2	3	1
2030331372012	2	1	NA	3	1
2030331372013	2	2	2	3	NA
2030331372014	3	1	2	3	NA
2030331372015	4	2	NA	4	2
2030331372016	3	NA	1	3	NA
2030331372017	2	1	NA	3	NA
2030331372018	3	NA	NA	3	3
2030331372019	3	3	NA	3	2
2030331372020	2	NA	1	3	NA
2030331372021	2	NA	NA	3	1
2030331372022	3	1	NA	3	2
Average	3.28235	2.28571	1.91667	3.38095238	2.83098592
Percentage	65.65	45.72	38.34	67.62	56.6

*NA = Not Attempted

Assessment of Course Outcomes through Assignments

Assignment number	Relevant Course Outcomes	Number of students completed assignment	Total Number of students	%percentage
1	CO1, CO2	80	86	93.02
2	CO1, CO2,CO3	82	86	95.35
3	CO1,	75	86	87.2
	CO2,CO3,CO5			
4	CO1,CO3,CO5	84	86	97.68
5	CO1,CO3,CO6	78	86	90.7
6	CO1, CO2,	84	86	97.68
	CO5,CO3,CO4,CO6			

Assessment of Course Outcomes

~		Cor		ion to P comes i	rogran n %	nme			Attair leve	nment el of	Achieveme
Course Outcomes	Assessment Tool	PO2	PO3	PO4	PO5	PO6	P07	PO11	cou outco (%	rse omes	nt (Goal: 70%) In Yes/No
	MSE Q.1	65.65	65.65	65.65	65.65	65.65	65.65	65.65	65.65		
	MSE Q.2	45.72	45.72	45.72	45.72	45.72	45.72	45.72	45.72		
	MSE Q.3	38.34	38.34	38.34	38.34	38.34	38.34	38.34	38.34	-	
	MSE Q.4	67.62	67.62	67.62	67.62	67.62	67.62	67.62	67.62	-	
	MSE Q.5	56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6		
CO1	Assignment	93.02	93.02	93.02	93.02	93.02	93.02	93.02	93.02	76	Yes
001	Assignment 2	95.35	95.35	95.35	95.35	95.35	95.35	95.35	95.35		100
	Assignment 3	87.2	87.2	87.2	87.2	87.2	87.2	87.2	87.2		
	Assignment 4	97.68	97.68	97.68	97.68	97.68	97.68	97.68	97.68	-	
	Assignment 5	90.7	90.7	90.7	90.7	90.7	90.7	90.7	90.7		
	Assignment 6	97.68	97.68	97.68	97.68	97.68	97.68	97.68	97.68		
	MSE Q.1	65.65	65.65	65.65	65.65	65.65	65.65	65.65	65.65		
	MSE Q.2	45.72	45.72	45.72	45.72	45.72	45.72	45.72	45.72	-	
	MSE Q.3	38.34	38.34	38.34	38.34	38.34	38.34	38.34	38.34	-	
	MSE Q.5	56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6		
CO2	Assignment	93.02	93.02	93.02	93.02	93.02	93.02	93.02	93.02	72.5	Yes
	Assignment 2	95.35	95.35	95.35	95.35	95.35	95.35	95.35	95.35		
	Assignment 3	87.2	87.2	87.2	87.2	87.2	87.2	87.2	87.2		
	Assignment 4	97.68	97.68	97.68	97.68	97.68	97.68	97.68	97.68		
CO2	MSE Q.2	45.72	45.72	45.72	45.72	45.72	45.72	45.72	45.72		17
CO3	MSE Q.5	56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6	78.9	Yes

	Assignment 2	95.35	95.35	95.35	95.35	95.35	95.35	95.35	95.35		
	Assignment 3	87.2	87.2	87.2	87.2	87.2	87.2	87.2	87.2		
	Assignment 4	97.68	97.68	97.68	97.68	97.68	97.68	97.68	97.68		
	Assignment 5	90.7	90.7	90.7	90.7	90.7	90.7	90.7	90.7		
CO4	Assignment 6	97.68	97.68	97.68	97.68	97.68	97.68	97.68	97.68	98	Yes
	MSE Q.3	38.34	38.34	38.34	38.34	38.34	38.34	38.34	38.34		
	MSE Q 4	67.62	67.62	67.62	67.62	67.62	67.62	67.62	67.62		
	MSE Q 5	56.6	56.6	56.6	56.6	56.6	56.6	56.6	56.6		
CO5	Assignment 2	95.35	95.35	95.35	95.35	95.35	95.35	95.35	95.35	73.8	Yes
	Assignment 3	87.2	87.2	87.2	87.2	87.2	87.2	87.2	87.2		
	Assignment 4	97.68	97.68	97.68	97.68	97.68	97.68	97.68	97.68		
	MSE Q.3	38.34		38.34	38.34	38.34	38.34	38.34	38.34		
	MSE Q.4	67.62	67.62	67.62	67.62	67.62	67.62	67.62	67.62		
	Assignment 1	93.02	93.02	93.02	93.02	93.02	93.02	93.02	93.02		
	Assignment 2	95.35	95.35	95.35	95.35	95.35	95.35	95.35	95.35	83.4	
CO6	Assignment 3	87.2	87.2	87.2	87.2	87.2	87.2	87.2	87.2	5	Yes
	Assignment 4	97.68	97.68	97.68	97.68	97.68	97.68	97.68	97.68		
	Assignment 5	90.7	90.7	90.7	90.7	90.7	90.7	90.7	90.7		
	Assignment 6	97.68	97.68	97.68	97.68	97.68	97.68	97.68	97.68		