



COURSE FILE

ON

Analog and Digital Communications

Course Code – EC403PC

II B.Tech ECE II-SEMESTER

A.Y.: 2022-2023

Prepared by

Mr. S. NARESH
Assistant Professor

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Disi-501 510

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Year	2022-2023
Course Title	Analog and Digital Communications
Course Code	EC403PC
Programme	B.Tech
Year & Semester	II Year II-Semester
Branch & Section	ECE-B
Regulation	R18
Course Faculty	Mr. S. NARESH, Assistant Professor

Index of Course File

S. No.	Name of the content
1	Institute vision and mission
2	Department vision and mission
3	Program Educational Objectives/ Program Specific Outcomes
4	Program Outcomes
5	Course Syllabus with Structure
6	Course Outcomes (COs)
7	Mapping CO with PO/PSO and Justification
8	Academic Calendar
9	Time table - Highlighting your course periods including tutorial
10	Lesson plan with number of hours/periods, TA/TM, Text/Reference books
11	Web references
12	Lecture notes
13	List of Power point presentations
14	University Question papers
15	Internal Question papers, Key with CO and BT
16	Assignment Question papers mapped with CO and BT
17	Result Analysis to identify weak and advanced learners
18	Result Analysis at the end of the course
19	Remedial classes schedule for weak students
20	Tutorial Topics
21	Course attainment sheets
22	Attendance register
23	Course file digital form



Sri Indu Institute of Engineering & Technology

Recognized Under 2(f) of UGC Act 1956

Approved by AICTE, New Delhi
Affiliated to JNTUH, Hyderabad.

VISION OF THE INSTITUTE

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

MISSION OF THE INSTITUTE

IM1: To offer outcome-based education and enhancement of technical and practical skills.

IM2: To Continuous assess of teaching-learning process through institute-industry collaboration.

IM3: To be a centre of excellence for innovative and emerging fields in technology development with state-of-art facilities to faculty and students' fraternity.

IM4: To Create an enterprising environment to ensure culture, ethics and social responsibility among the stakeholders.

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



Sri Indu Institute of Engineering & Technology

Recognized Under 2(f) of UGC Act 1956
Approved by AICTE, New Delhi
Affiliated to JNTUH, Hyderabad.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VISION OF THE DEPARTMENT

To become a recognized center in the field of Electronics and Communication Engineering by producing creative engineers with social responsibility and address ever-changing global challenges.

MISSION OF THE DEPARTMENT

- DM1:** To facilitate an academic environment that enables student's centric learning.
- DM2:** To provide state-of-the-art hardware and software technologies to meet industry requirements.
- DM3:** To continuously update the Academic and Research infrastructure.
- DM4:** To Conduct Technical Development Programs for overall professional caliber of Stake Holders.

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



PROGRAM EDUCATIONAL OBJECTIVES

Program Educational objectives are to Promote:

- PEO1:** Graduates with a strong foundation in Electronics and Communication Engineering, Science and Technology to become successful in the chosen professional career.
- PEO2:** Graduates with ability to execute innovative ideas for Research and Development with continuous learning.
- PEO3:** Graduates inculcated with industry based soft-skills to enable employability.
- PEO4:** Graduates demonstrate with ability to work in interdisciplinary teams and ethical professional behavior.

PROGRAM SPECIFIC OUTCOMES

- PSO 1: Design Skills:** Design, analysis and development a economical system in the area of Embedded system & VLSI design.
- PSO 2: Software Usage:** Ability to investigate and solve the engineering problems using MATLAB, Keil and Xilinx.

A handwritten signature in blue ink, appearing to be 'L. Srinivas', is written over a horizontal line.

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510

A handwritten signature in green ink, appearing to be 'Sri Indu', is written over a horizontal line.

PRINCIPAL
Sri Indu Institute of Engineering & Tect.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



PROGRAM OUTCOMES

- 1. ENGINEERING KNOWLEDGE:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. PROBLEM ANALYSIS:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. DESIGN/DEVELOPMENT OF SOLUTIONS:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. MODERN TOOL USAGE:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- 6. THE ENGINEER AND SOCIETY:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. ETHICS:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. INDIVIDUAL AND TEAM WORK:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. COMMUNICATION:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.
- 11. PROJECT MANAGEMENT AND FINANCE:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. LIFE-LONG LEARNING:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech. in ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE & SYLLABUS

(Applicable From 2018-19 Admitted Batch)

II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA401BS	Laplace Transforms, Numerical Methods & Complex Variables	3	1	0	4
2	EC402PC	Electromagnetic Fields and Waves	3	0	0	3
3	EC403PC	Analog and Digital Communications	3	1	0	4
4	EC404PC	Linear IC Applications	3	0	0	3
5	EC405PC	Electronic Circuit Analysis	3	0	0	3
6	EC406PC	Analog and Digital Communications Lab	0	0	3	1.5
7	EC407PC	IC Applications Lab	0	0	3	1.5
8	EC408PC	Electronic Circuit Analysis Lab	0	0	2	1
9	*MC409	Gender Sensitization Lab	0	0	2	0
		Total Credits	15	2	10	21

COURSE SYLLABUS

EC403PC: ANALOG AND DIGITAL COMMUNICATIONS

B.Tech. II Year II Semester

L T P C
3 1 0 4

UNIT - I

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves - Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB- SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial side band modulation.

UNIT - II

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Narrow band FM, Wideband FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.

UNIT - III

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.

UNIT - IV

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM. **Pulse Code Modulation:** PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT - V

Digital Modulation Techniques: ASK- Modulator, Coherent ASK Detector, FSK- Modulator, Non- Coherent FSK Detector, BPSK- Modulator, Coherent BPSK Detection. Principles of QPSK, DifferentialPSK and QAM.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.

TEXT BOOKS:

1. Analog and Digital Communications – Simon Haykin, John Wiley, 2005.
2. Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5thEdition, 2009, PHI.

REFERENCE BOOKS:

1. Principles of Communication Systems - Herbert Taub, Donald L Schilling, Goutam Saha, 3rdEdition, McGraw-Hill, 2008.
2. Electronic Communications – Dennis Roddy and John Coolean , 4th Edition , PEA, 2004
3. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004
4. Analog and Digital Communication – K. Sam Shanmugam, Willey ,2005



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

Course Outcomes

Course Name: Analog and Digital Communications

Course Code: EC403PC

Course Year/ Semester: II B.Tech ECE-B, II Semester

CO Number	Course Outcome (CO)
	After completion of the course student will be able to :
C223.1	Understand various continuous wave modulation and demodulation techniques.(Understand)
C223.2	Analyze Frequency Modulation (FM) and Phase Modulation (PM) Techniques.(Analyze)
C223.3	Illustrate about AM and FM transmitters.(Understand)
C223.4	Design AM and FM receivers.(Create)
C223.5	Distinguish various Pulse Modulation Techniques.(Analyze)
C223.6	Explain various digital modulation techniques and baseband transmission.(Evaluate)



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siet.ac.in/>

CO - PO/PSO Mapping & Justification

Course Name: Analog and Digital Communications

Course Code: EC403PC

Class: II B.Tech ECE-B

A.Y. : 2022-23

Semester: II

Course Outcomes:

After completing this course the student will be able to:

C223.1: Understand various continuous wave modulation and demodulation techniques.(Understand)

C223.2: Analyze Frequency Modulation (FM) and Phase Modulation (PM) Techniques.(Analyze)

C223.3: Illustrate about AM and FM transmitters.(Understand)

C223.4: Design AM and FM receivers.(Create)

C223.5: Distinguish various Pulse Modulation Techniques.(Analyze)

C223.6: Explain various digital modulation techniques and baseband transmission.(Evaluate)

Mapping of course outcomes with program outcomes:

High -3

Medium -2

Low-1

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
C223.1	3	3	-	3	-	3	3	-	-	-	-	3	2	3
C223.2	2	3	2	1	3	-	-	-	-	-	2	-	2	3
C223.3	3	1	-	3	-	-	-	-	-	-	-	2	2	3
C223.4	2	3	2	-	2	-	3	-	-	-	-	-	2	3
C223.5	2	-	-	3	3	-	-	-	-	-	3	3	3	3
C223.6	3	2	3	2	-	3	-	-	-	-	-	-	2	3
C223	2.50	2.40	2.33	2.40	2.67	3.0	3	-	-	-	2.5	2.6	2.17	3

CO-PO/PSO Mapping Justification

Course: Analog and Digital Communications (C223)

Class: II ECE - B

- PO1. **ENGINEERING KNOWLEDGE:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2. **PROBLEM ANALYSIS:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3. **DESIGN/DEVELOPMENT OF SOLUTIONS:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4. **CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. **MODERN TOOL USAGE:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6. **THE ENGINEER AND SOCIETY:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7. **ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate knowledge of, and need for sustainable development.
- PO11. **PROJECT MANAGEMENT AND FINANCE:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12. **LIFE-LONG LEARNING:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
- PSO1. **Design Skills:** Design, analysis and development a economical system in the area of Embedded system & VLSI design.
- PSO2. **Software Usage:** Ability to investigate and solve the engineering problems using MATLAB, Keil and Xilinx.

CO-PO Mapping Justification:

C223.1: Understand various continuous wave modulation and demodulation techniques.(Understand)

	Justification
PO1	Students able to apply the knowledge of mathematics, science and engineering fundamentals to understand modulation and demodulation techniques.
PO2	Students able to identify and analyze the problems associated with continuous wave modulation.
PO4	Students able to use research based knowledge and research methods to provide valid conclusions on different modulation techniques.
PO6	Students able to apply reasoning knowledge to assess societal issues relevant to modulation techniques.
PO7	Students can able to understand the impact of modulation techniques in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO12	Students can able to recognize the need for modulation techniques, and have ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	Students can able to design, analysis and development a new modulation techniques using different techniques.
PSO2	Students can able to investigate and solve the engineering problems of modulation techniques using MATLAB.

C223.2: Analyze Frequency Modulation (FM) and Phase Modulation (PM) Techniques.(Analyze)

	Justification
PO1	Students able to apply the knowledge of mathematics, science and engineering fundamentals to analyze FM and PM modulation techniques.
PO2	Students able to identify and analyze the problems associated with PM and FM modulation techniques.
PO3	Students able to design solutions for complex problems related with FM and PM modulations.
PO4	Students able to use research based knowledge and research methods to provide valid conclusions on FM and PM modulation techniques.
PO5	Students able to select and apply appropriate techniques to complex modulation activities with an understanding of the limitations.
PO11	Students able to demonstrate knowledge of FM and PM modulation and demodulation techniques and apply these to project works.
PSO1	Students can able to design, analysis and development a new modulation techniques using different techniques.
PSO2	Students can able to investigate and solve the engineering problems of PM and FM modulation techniques using MATLAB.

C223.3: Illustrate about AM and FM transmitters.(Understand)

	Justification
PO1	Students able to apply the knowledge of mathematics, science and engineering fundamentals to analyze AM and FM transmitters.
PO2	Students able to identify and analyze the problems associated with AM and FM transmitters.
PO4	Students able to use research methods to provide valid conclusions on AM and FM transmitters.
PO12	Students can able to recognize the need for AM and FM transmitters, and have ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	Students can able to design, analysis and development a new transmitters.
PSO2	Students can able to investigate and solve the engineering problems of AM and FM transmitters using MATLAB.

C223.4: Design AM and FM receivers.(Create)

	Justification
PO1	Students able to apply the knowledge of mathematics, science and engineering fundamentals to analyze AM and FM receivers.
PO2	Students able to identify and analyze the problems in AM and FM receivers.
PO3	Students able to design solutions for complex problems of AM and FM receivers.
PO5	Students able to select and apply appropriate techniques to complex activities in AM and FM receivers with an understanding of the limitations.
PO7	Students can able to understand the impact of AM and FM receivers in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PSO1	Students can able to design, analysis and development a new type of receivers.
PSO2	Students can able to investigate and solve the engineering problems of AM and FM receivers using different modern tools.

C223.5: Distinguish various Pulse Modulation Techniques.(Analyze)

	Justification
PO1	Students able to apply the knowledge of mathematics, science and engineering fundamentals to analyze different pulse modulation techniques.
PO4	Students able to use research methods to provide valid conclusions on different pulse modulation techniques.
PO5	Students able to select and apply appropriate techniques to complex activities in different pulse modulation techniques with an understanding of the limitations.
PO11	Students able to demonstrate knowledge of different pulse modulation techniques and apply these to project works.
PO12	Students can able to recognize the need for pulse modulation techniques, and have ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	Students can able to design, analysis and development a new type of pulse modulation techniques.
PSO2	Students can able to investigate and solve the engineering problems of different pulse modulation techniques using different modern tools.

C223.6: Explain various digital modulation techniques and baseband transmission.(Evaluate)

	Justification
PO1	Students able to apply the knowledge of mathematics, science and engineering fundamentals to analyze various digital modulation techniques.
PO2	Students able to identify and analyze the problems of various digital modulation techniques.
PO3	Students able to design solutions for complex problems of digital modulation techniques.
PO4	Students able to use research methods to provide valid conclusions on different digital modulation techniques.
PO6	Students able to apply reasoning knowledge to assess societal issues relevant to digital modulation techniques.
PSO1	Students can able to design, analysis and development a new type of digital modulation techniques.
PSO2	Students can able to investigate and solve the engineering problems of different digital modulation techniques using different modern tools.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

ACADEMIC CALENDAR 2022-23

B.Tech./B.Pharm. II YEAR II SEMESTER

II YEAR II SEMESTER

S. No	Description	Duration	
		From	To
1	Commencement of II Semester classwork	01.05.2023	
2	1 st Spell of Instructions (including Summer Vacation)	01.05.2023	08.07.2023 (10 Weeks)
3	Summer Vacation	15.05.2023	27.05.2023 (2 Weeks)
4	First Mid Term Examinations	10.07.2023	15.07.2023 (1 Week)
5	Submission of First Mid Term Exam Marks to the University on or before	22.07.2023	
6	2 nd Spell of Instructions	18.07.2023	11.09.2023 (8 Weeks)
7	Second Mid Term Examinations	12.09.2023	16.09.2023 (1 Week)
8	Preparation Holidays and Practical Examinations	19.09.2023	23.09.2023 (1 Week)
9	Submission of Second Mid Term Exam Marks to the University on or before	23.09.2023	
10	End Semester Examinations	25.09.2023	07.10.2023 (2 Weeks)

Note: No. of Working / Instructional Days: 92

**Sd./-xxxx
REGISTRAR**



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

UGC Autonomous, Accredited by NAAC A+ Grade, Recognized under 2(f) of UGC Act 1956.

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

Khalsa Ibrahimpatnam, Sheriguda(V), Ibrahimpatnam(M), Ranga Reddy Dist., Telangana - 501 510

<https://siiet.ac.in/>

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Class Timetable

CLASS: II-B.Tech ECE-B

A.Y:2022-23

SEMESTER: II

LH: C-102

TIME/ DAY	I 9:40-10:30	II 10:30 -11:20	III 11:20-12:10	IV 12:10-1:00	1:00- 1:30	V 1:30-2:20	VI 2:20-3:10	VII 3:10-4:00	
MON	EMF&W	ECA	A&DC	LTNM	L U N C H	LICA	ECA LAB / GS LAB		
TUE	LICA	A&DC	EMF&W	ECA		A&DC LAB / ICA LAB			
WED	LTNM	EMF&W	LICA	ECA		A&DC(T) LTNM(T)/		CO-CU/DAA	
THU	A&DC	COUN	GS LAB / ECA LAB			LTNM	EMF&W	SPORTS	
FRI	ECA	EMF&W	LTNM(T)/A&DC(T)	LICA		A&DC	LTNM	LIB	
SAT	LICA	LTNM	ECA	A&DC		ICA LAB / A&DC LAB			

*(T) - Tutorial Concern Faculty

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
MA401BS	LTNM-Laplace Transforms, Numerical Methods & Complex Variables	Dr.B.Mahesh	EC406PC	A&DC LAB-Analog and Digital Communications Lab	M.Ganesh/S.Naresh/K.Rajender
			EC407PC	ICA LAB-IC Applications Lab	P.Kavitha/A.Vaani/T.Divya
EC402PC	EMF&W-Electromagnetic Fields and Waves	Dr.S.Suresh	EC408PC	ECA LAB-Electronic Circuit Analysis Lab	Dr.D.Lakshmaiah/Dr.S.Suresh/K.Mallaiah
EC403PC	A&DC-Analog and Digital Communications	S.Naresh	*MC409	GS LAB-Gender Sensitization Lab	G.Ananda Rao
EC404PC	LICA-Linear IC Applications	P.Kavitha	COUN	Counseling	B.Ashwini/T.Divya/G.Anusha
EC405PC	ECA-Electronic Circuit Analysis	Dr.D.Lakshmaiah	SPORTS	Sports	G.Nirmala/M.Srilatha
			CO-CU/DAA	Co-Curricular/ Dept. Assoc.Activities	S.Alekhya/I.Venu/K.Bhaskar Reddy
			LIB	Library	A.Sindhuja/O.Swathi

S.S.A.
Class Incharge

Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH

Principal
Sri Indu Institute of Engineering & Tech
Sheriguda(VIII), Ibrahimpatnam
Ranga Reddy Dist. Telangana - 501 510



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

Lesson Plan with Lesson Plan with Number of Hours/Periods, Teaching Aids/Methods, Text/Reference Book

Course Name: Analog and Digital Communications

Course Code: EC403PC

Class: II B.Tech- II Sem ECE – B

Session Duration: 50 minutes

UNIT - I

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves - Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial side band modulation.

No. of Sessions Planned	Topics	Reference	Teaching Method/Aids
1	Need for modulation	T1,R1	BB
1	Time and frequency domain description of Amplitude Modulation	T1,R1	BB
1	Single tone modulation	T1,R2	BB
1	Power relations in AM waves	T1,R4	BB
1	Generation of AM waves using Switching modulator	T1,R1	BB
1	Detection of AM Waves using Envelope detector	T2,R1	BB
1	Time and frequency domain description of DSBSC modulation	T1,R3	BB
1	Generation of DSBSC Waves using Balanced Modulator	T1,R4	PPT
1	Detection of DSB- SC Modulated waves using Coherent detection	T2,R3	BB
1	Detection of DSB- SC Modulated waves using COSTAS Loop	T2,R3	BB
1	Time and frequency domain description of SSB modulation	T2,R3	BB
1	Generation of SSBSC Waves using frequency discrimination method	T1,R1	BB
1	Generation of SSBSC Waves using phase discrimination method	T1,R4	BB
1	Demodulation of SSB waves	T2,R1	BB
1	Vestigial sideband modulation and demodulation	T1,R2	PPT
1	Problems	T1,R1	BB

Course Outcome (C223.1): Understand various continuous wave modulation and demodulation techniques. (Understand)

Total Number of Hours/Unit: 16

UNIT - II

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	Single tone frequency modulation	T1,R4	BB
2	Spectrum Analysis of Sinusoidal FM Wave using Bessel functions	T1,R1	BB
1	Narrow band FM	T2,R1	BB
2	Wideband FM	T1,R3	BB
1	Constant Average Power	T1,R4	BB
1	Transmission bandwidth of FM Wave	T1,R4	BB
1	Generation of FM Signal using Armstrong Method	T2,R1	BB
1	Detection of FM Signal using Balanced slope detector	T1,R2	BB
1	Detection of FM Signal using Phase locked loop	T1,R1	PPT
1	Comparison of FM and AM	T2,R1	BB
1	Concept of Pre-emphasis and de-emphasis	T1,R3	PPT
1	Introduction to Phase Modulation	T1,R4	BB
1	Problems	T1,R3	BB

Course Outcome (C223.2): Analyze Frequency Modulation (FM) and Phase Modulation (PM) Techniques. (Analyze)

Total Number of Hours/Unit: 15

UNIT - III

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	Classification of Transmitters	T1,R4	BB
2	AM Transmitters	T2,R1	BB
1	FM Transmitter	T1,R2	BB
1	Radio Receiver & Receiver Types	T1,R1	BB
1	Tuned radio frequency receiver	T2,R1	BB
2	Superhetrodyne receiver	T1,R3	PPT
1	RF section and Characteristics	T1,R4	BB
1	Frequency changing and tracking	T1,R4	BB
1	Intermediate frequency	T2,R1	BB
1	Image frequency	T2,R1	BB
2	Simple AGC and Delayed AGC	T1,R2	BB
1	Amplitude limiting in FM	T1,R1	BB
1	FM Receiver	T2,R1	BB
1	Comparison of AM and FM Receivers	T1,R4	BB
1	Problems	T2,R1	BB

Course Outcome (C223.3): Illustrate about AM and FM transmitters.(Understand)

Course Outcome (C223.4): Design AM and FM receivers.(Create)

Total Number of Hours/Unit: 18

UNIT - IV

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM.

Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	Introduction to Pulse modulation techniques	T1,R1	BB
1	Pulse Amplitude Modulation	T2,R1	BB
1	Pulse Amplitude Demodulation	T1,R3	BB
1	Pulse Width Modulation	T1,R4	BB
1	Pulse Width Demodulation	T1,R4	BB
1	Pulse Position Modulation	T2,R1	BB
1	Pulse Position Demodulation	T1,R4	BB
1	Comparison of FDM and TDM	T1,R4	BB
1	PCM Generation and Reconstruction	T2,R1	PPT

1	Quantization Noise	T1,R3	BB
1	Types of Quantization	T1,R4	BB
1	Companding	T1,R4	BB
1	DPCM modulation and demodulation	T2,R1	BB
1	Delta modulation and demodulation	T2,R1	BB
1	Drawbacks of Delta Modulation	T1,R2	BB
1	Adaptive Delta modulation and demodulation	T2,R1	BB
1	Noise in PCM and DM	T1,R2	BB

Course Outcome (C223.5): Distinguish various Pulse Modulation Techniques.(Analyze)

Total Number of Hours/Unit: 17

UNIT - V

Digital Modulation Techniques: ASK- Modulator, Coherent ASK Detector, FSK- Modulator, Non- Coherent FSK Detector, BPSK- Modulator, Coherent BPSK Detection. Principles of QPSK, Differential PSK and QAM.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.

No. of Sessions Planned	Topics	Reference	Teaching Method/ Aids
1	ASK Modulator	T1,R4	BB
1	Coherent ASK Detector	T1,R4	BB
1	FSK Modulator	T2,R1	BB
1	Non- Coherent FSK Detector	T1,R4	BB
1	BPSK Modulator	T1,R4	BB
1	Coherent BPSK Detection	T2,R1	BB
1	QPSK modulation	T1,R2	BB
1	QPSK demodulation	T2,R1	BB
1	QPSK modulation	T1,R2	BB
1	QPSK demodulation	T1,R4	BB
1	QAM modulation	T1,R4	BB
1	QAM demodulation	T2,R1	BB
1	Baseband Signal Receiver	T2,R1	BB
1	Probability of Error for different modulation techniques	T2,R1	BB
1	Optimum Receiver	T1,R2	BB
1	Coherent Reception	T2,R1	BB
1	Inter Symbol Interference	T1,R2	BB
1	Eye Diagrams/Eye Patterns	T1,R4	BB

Course Outcome (C223.6): Explain various digital modulation techniques and baseband transmission.(Evaluate)

Total Number of Hours/Unit: 18

TEXT BOOKS:

T1. Analog and Digital Communications – Simon Haykin, John Wiley, 2005.

T2. Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5th Edition, 2009, PHI.

REFERENCE BOOKS:

R1. Principles of Communication Systems - Herbert Taub, Donald L Schilling, Goutam Saha, 3rd Edition, McGraw-Hill, 2008.

R2. Electronic Communications – Dennis Roddy and John Coolean , 4th Edition , PEA, 2004

R3. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004

R4.Analog and Digital Communication – K. Sam Shanmugam, Willey ,2005



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

WEB REFERENCES

Course Name: Analog and Digital Communications

Course Code: EC403PC

Class: B.Tech- II ECE – B

- 1) <http://debracollege.dspaces.org/bitstream/123456789/559/1/Electronic%20Communications%20by%20Dennis%20Roddy%2C%20John%20Coolen%20.pdf>
- 2) <http://bayanbox.ir/view/3550521507140550098/shanmugam.pdf>
- 3) <https://archive.nptel.ac.in/courses/117/105/117105143/>
- 4) <https://nptel.ac.in/courses/117101051>
- 5) https://onlinecourses.nptel.ac.in/noc21_ee11/preview
- 6) <https://archive.nptel.ac.in/courses/108/102/108102096/>



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

Lecture Notes

Course Name: Analog and Digital Communications

Course Code: EC403PC

Course Year/ Semester: B.Tech II ECE – B Section

S.No	Unit Number	Lecture Notes Link
1	Unit-1	https://drive.google.com/file/d/1SgB8SZA3PHJ9jIh-BU2_lbz467RxBwFX/view?usp=sharing
2	Unit-2	https://drive.google.com/file/d/1scfdiIW0w4XDpoY74fDWN0CkvdRdDlse/view?usp=sharing
3	Unit-3	https://drive.google.com/file/d/1FLlr0BK_MThZLdhr6ErySkSm1yRzJns6/view?usp=sharing
4	Unit-4	https://drive.google.com/file/d/19t5xfoTi5TCSHF-aSWTrmJOY4K3kf6bK/view?usp=sharing
5	Unit-5	https://drive.google.com/file/d/1vAzj4zhHLto52JV2GHHAlppEpTL5bgKE/view?usp=sharing



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

List of PPTs

Course Name: Analog and Digital Communications

Course Code: EC403PC

Course Year/ Semester: B.Tech II ECE – B

S.No	Topic Name& PPT Link
1	Generation of DSBSC Waves using Balanced Modulator : https://drive.google.com/file/d/15OXszsHHg28PHJMIxhpUPSAn6yxURTRB/view?usp=sharing
2	Vestigial Sideband Modulation and Demodulation : https://drive.google.com/file/d/1RqFJ6Dvs3wGRmLIF0jx_mwqZET95uK7C/view?usp=sharing
3	Detection of FM Signal Using Phase Locked Loop : https://drive.google.com/file/d/1VKSwhbLuO_2dEVlpSAIQ75a6EmVz5ub/view?usp=sharing
4	Concept of Pre-emphasis and De-emphasis : https://drive.google.com/file/d/1Xr3gQYub3FRt0uZ-XzNZDwdWZb59rziW/view?usp=sharing
5	Superhetrodyne Receiver : https://drive.google.com/file/d/1UXVW2Nqlm7PdQJ6tST7Ny01cSzelpBBi/view?usp=sharing
6	PCM Generation and Reconstruction : https://drive.google.com/file/d/1SEUH2WMDadLHvYdDU9uDsbMjIGkVgPMQ/view?usp=sharing

Code No: 154AC**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year II Semester Examinations, August/September - 2021****ANALOG AND DIGITAL COMMUNICATIONS****(Electronics and Communication Engineering)****Time: 3 Hours****Max. Marks: 75**

Answer any five questions
All questions carry equal marks

- - -

- 1.a) Describe the single tone modulation of SSB with necessary equations. Assume both modulating and carrier signals are sinusoids.
b) With the help of circuit diagram explain the operation of square law modulator for AM. [7+8]
- 2.a) With neat diagrams, explain about the VSB modulation system and also explain its applications.
b) When the modulation percentage is 75, an AM transmitter produces 10KW. How much of this is carrier power. What would be the percentage power saving if the carrier and one of the side bands were suppressed? [7+8]
- 3.a) Explain the detection of FM wave using balanced frequency discrimination.
b) State and explain the concept of transmission bandwidth. [9+6]
- 4.a) Draw and explain how PLL is used in detection of FM signal.
b) What is the purpose of pre-emphasis and de-emphasis filtering? Explain the filtering process with suitable sketches. [7+8]
- 5.a) What is AGC? What are different types of AGC? With a neat diagram explain a simple AGC circuit.
b) List and explain the characteristics of RF section. [9+6]
- 6.a) Explain the working of tuned radio frequency receiver with the help of a block diagram.
b) Compare AM and FM Receivers. [9+6]
- 7.a) Explain, how a PPM signal can be generated from PWM signal.
b) Compare PAM, PWM and PPM pulse modulation technique. [7+8]
- 8.a) Derive the probability error of QPSK system.
b) Derive the bit error probability of a coherent ASK signaling scheme. [7+8]

---ooOoo---

Code No: 154AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech II Year II Semester Examinations, August/September - 2022****ANALOG AND DIGITAL COMMUNICATIONS****(Electronics and Communication Engineering)****Time: 3 hours****Max. Marks: 75**

Answer any five questions
All questions carry equal marks

- - -

- 1.a) Explain how switching modulator is used to generate AM wave.
b) A receiver of SSB signal in which the modulation is a single spectral component has a normalized power of 0.5 volt^2 . A carrier has added to the signal and the carrier plus signal are applied to a diode demodulator. The carrier amplitude is to be adjusted so that at the demodulator output 90 percent of the normalized power is in the recovered modulating waveform. Neglect dc components. Find the carrier amplitude required. [8+7]
- 2.a) What is COSTAS loop? In which this modulation is used? Also draw and explain the block diagram of it.
b) Consider the message signal
 $m(t) = 20 \cos(2\pi t)$ volts and the carrier wave $c(t) = 50 \cos(100\pi t)$ volts
i) Sketch the resulting AM wave for 75% modulation
ii) Find the power developed across a load of 100 ohms due to the AM wave. [9+6]
- 3.a) Draw the spectrum of FM wave and compare narrow band and wide band FM.
b) A carrier which attains a peak voltage of 5 volts has a frequency of 100 MHz. This carrier is frequency modulated by a sinusoidal waveform of frequency 2 kHz to such extent that the frequency deviation from the carrier frequency is 75 kHz. The modulated waveform passes through zero and is increasing at time $t=0$. Write an expression for the modulated carrier waveform. [9+6]
- 4.a) Why pre-emphasis and de-emphasis needed in FM? How to generate it?
b) A carrier of frequency 10^6 Hz and amplitude 3 volts is frequency – modulated by a sinusoidal modulating waveform of frequency 500 Hz and of peak amplitude 1 volt. As a consequence, the frequency deviation is 1 kHz. The level of modulating waveform is changed to 2 volts peak and the modulating frequency is changed to 2 kHz. Write the expression for the new modulated waveform. [7+8]
- 5.a) What is AGC? How to generate it?
b) Explain the significance of intermediate frequency in Receiver with examples. [8+7]
- 6.a) Draw and explain each block of AM Transmitter.
b) Compare superhetrodyne receiver with TRF receiver. [10+5]
- 7.a) What are the different types of pulse modulations? Compare them.
b) What is companding? What are the different types? Explain them. [8+7]
- 8.a) Describe the concept of Inter symbol Interference.
b) Explain the principle of QPSK and DPSK. [5+10]

Code No: 154AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester (Special) Examinations, January/February - 2021
ANALOG AND DIGITAL COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 2 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- - -

- 1.a) What is the principle of Amplitude modulation? Derive expression for the AM wave and draw its spectrum.
- b) Compare AM with DSBSC and SSBSC. [8+7]
- 2.a) Explain the coherent detection of DSBSC.
- b) Discuss any one method of generating SSB wave. [7+8]
- 3.a) Compare and contrast NBFM with WBFM.
- b) Discuss the need of pre emphasis and de emphasis in FM and explain their operations. [7+8]
- 4.a) What are the two methods of producing an FM wave? And explain.
- b) An angle modulated signal has the form $v(t)=100\cos(2\pi f_c t+4\sin 2000\pi t)$ when $f_c=10\text{MHz}$
- i) Determine average transmitted power
- ii) Determine peak phase deviation
- iii) Determine the peak frequency deviation
- iv) Is this an FM or a PM signal? Explain. [9+6]
- 5.a) Explain the block diagram of TRF receiver. Also explain the basic super Heterodyne principle.
- b) List out the advantages and disadvantages of TRF receiver. [9+6]
- 6.a) What factors govern the choice of intermediate frequency. In a broadcast super heterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 100. If the IF frequency is 455 kHz, determine the image frequency and its rejection ratio for tuning at 1.1 MHz a station.
- b) Draw and explain FM Transmitter. [7+8]
- 7.a) Describe the generation and demodulation of PPM with the help of block diagram and hence discuss its spectral characteristics.
- b) Explain the quantisation and companding in PCM. [8+7]
- 8.a) Write a note on QPSK Modulator and demodulator. Draw its phasor and constellation diagram.
- b) Draw the Eye pattern and indicate how ISI is measured from it. [9+6]

Code No: 154AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech II Year II Semester Examinations, July/August - 2021****ANALOG AND DIGITAL COMMUNICATIONS****(Electronics and Communication Engineering)****Time: 3 Hours****Max. Marks: 75****Answer any five questions****All questions carry equal marks**

- - -

- 1.a) Explain about COSTAS loop with a neat block diagram for demodulating DSB-SC wave.
b) Explain the working of envelope detector with a neat circuit diagram. [8+7]
- 2.a) Define a standard form of amplitude modulation and explain the time and frequency domain expression of an AM wave.
b) Calculate the percentage power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to a depth of 100% and 50%. [7+8]
- 3.a) Derive the expression for FM signal from fundamentals and differentiate narrow band FM and wide band FM.
b) For an FM modulator with a modulating signal $m(t) = V_m \sin(300 \times 10^3 t)$, the carrier signal $V_c(t) = 8 \sin(6.5 \times 10^6 t)$ and the modulator index = 2. Find out the significant sideband frequencies and their amplitudes. [7+8]
- 4.a) Compare noise performance of PM and FM system.
b) Explain the indirect method of generation of FM wave and any one method of demodulating an FM wave [6+9]
- 5.a) Draw the block diagram of Superhetrodyne receiver and explain the function of each block.
b) Compare and contrast AM and FM receivers. [9+6]
- 6.a) With a neat diagram explain AM receiver tracking and tracking curve.
b) How the performance of the PCM system is influenced by the noise and calculate SNR in the PCM system? [7+8]
- 7.a) With a neat block diagram explain the generation of PWM signal.
b) With a neat waveform explain Flat-top PAM sampling. [7+8]
- 8.a) Discuss about the coherent FSK detector and non-coherent FSK detector.
b) Explain the generation and reception of DPSK signals with a neat block diagram. [7+8]

---ooOoo---



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956.

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

<https://siiet.ac.in/>



B.TECH II Year II SEM Mid-I Examinations, JULY -2023

Set - I

Year & Branch: II ECE-A&B

Date: 11.07.2023(FN)

Subject: Analog and Digital Communications (A&DC)

Max. Marks: 10

Time: 1 Hour

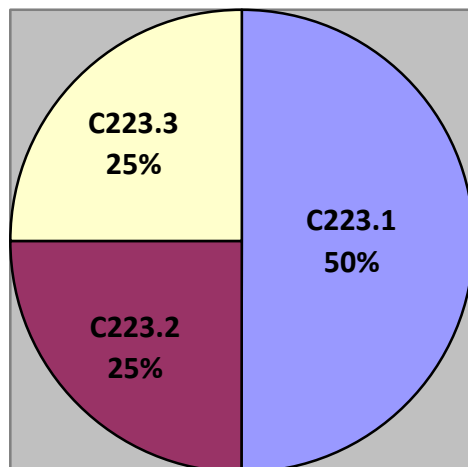
Answer any **TWO** Questions. All Question Carry Equal Marks

2*5=10 marks

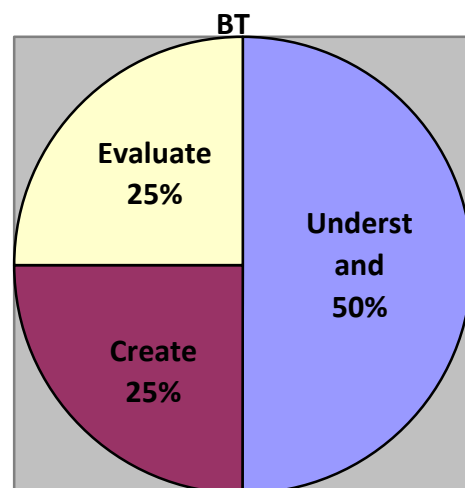
1. Explain the Need for Modulation. (C223.1) (Understand)
2. Discuss Wideband FM in detail. (C223.2) (Create)
3. Describe the block diagram of FM transmitter. (C223.3) (Evaluate)
4. Explain the Time Domain Description of SSB-SC Modulation. (C223.1) (Understand)

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

Question Paper Mapping with CO's



Question Paper Mapping with





SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956.

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

<https://siiet.ac.in/>



B.TECH II Year II SEM Mid-I Examinations, JULY -2023

Objective Type Exam

Year & Branch: II ECE-A&B

Date: 11.07.2023(FN)

Subject: Analog and Digital Communications (A&DC)

Max. Marks: 10

Time: 20 Mins.

Name of the Student:

Roll No:

Marks:

Answer All the Questions

I. Choose the Correct Answer

10*0.5=5 Marks

- The process of transferring an information from source to the destination is called []
A) Modulation
B) Communication
C) Demodulation
D) None of the above.
- Balanced Modulator is also called as []
A) Bridge Modulator
B) Gate Modulator
C) Product Modulator
D) All of the Above
- The signal which contains Information is []
A) Carrier Signal
B) Message Signal
C) Modulated Signal
D) All of the Above
- Choose the **WRONG** statement from below statements []
A) Bandwidth of AM is $= 2f_m$
B) Bandwidth of DSB-SC is $= 2f_m$
C) Bandwidth of SSB-SC is $= 2f_m$
D) Bandwidth of VSB-SC is $= f_m + f_v$
- The output signal of modulation process is []
A) Carrier Signal $c(t)$
B) Message Signal $m(t)$
C) Modulated Signal $S(t)$
D) All of the Above
- Choose the **WRONG** statement from below statements []
A) Message signal equation is $m(t) = A_m \cos(2\pi f_m t)$
B) Carrier signal equation is $m(t) = A_c \cos(2\pi f_c t)$
C) AM signal Standard expression is $S_{AM}(t) = (A_c - m(t)) \cos(2\pi f_c t)$
D) AM signal consists of 3 components. They are Carrier Signal + USB + LSB



B.TECH II Year II SEM Mid-II Examinations, SEPT -2023

Set - I

Year &Branch: II ECE-A&B

Date: 13.09.2023(FN)

Subject: Analog and Digital Communications (A&DC)

Max. Marks: 10

Time: 1 Hour

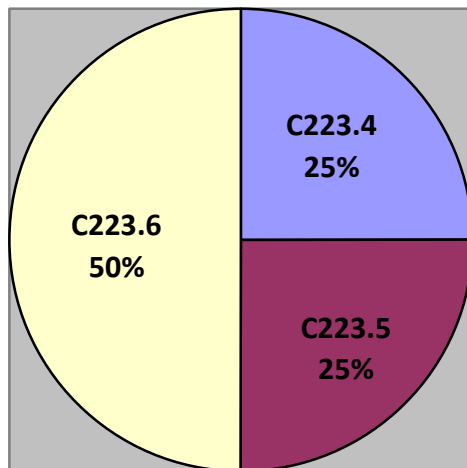
Answer any **TWO** Questions. All Question Carry Equal Marks

2*5=10 marks

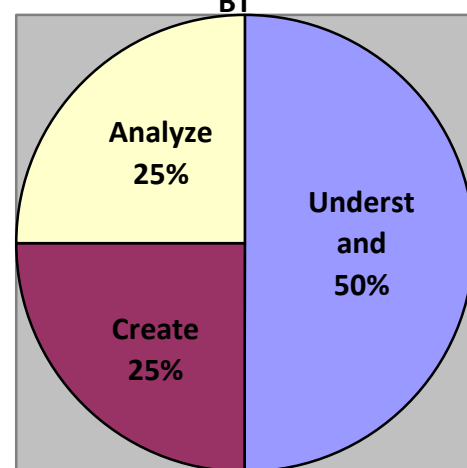
1. Discuss Eye diagram in detail. (C223.6) (Create)
2. Explain FM Receiver in Detail. (C223.4) (Understand)
3. Illustrate the Generation of PWM signal. (C223.5) (Understand)
4. Differentiate different digital Modulation techniques. (C223.6) (Analyze)

-----All the Best-----

Question Paper Mapping with CO's



Question Paper Mapping with BT





SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956.

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

<https://siiet.ac.in/>



B.TECH II Year II SEM Mid-II Examinations, SEPT -2023 **Objective Type**

Year & Branch: **II –ECE-A & B**

Date: 13.09.2023(FN)

Subject: **Analog & Digital Communications**

Max. Marks: **10**

Time: **20 Mins**

Name:

Roll No:

Choose the correct answer

10*0.5=5 Marks

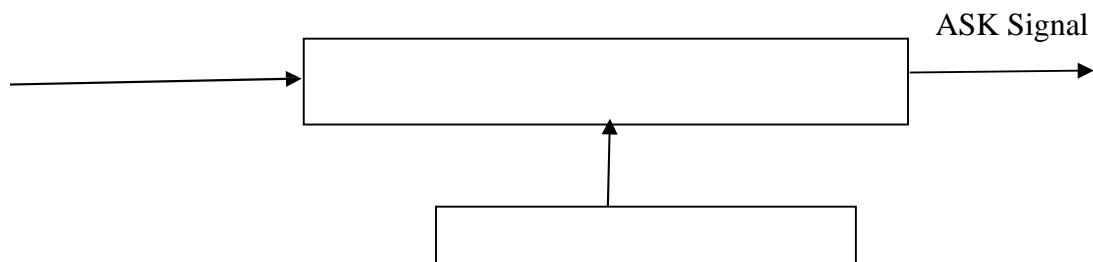
1. Tuned Radio Frequency Receiver & Superhetrodyne Receiver are the two types of []
A) FM Receivers
B) AM Receivers
C) PM Receivers
D) APM Receivers
2. The output frequency of a Mixer device is called []
A) Intermediate Frequency
B) Orthogonal Frequency
C) Angle Frequency
D) None
3. PAM,PWM,PPM are the type of_____ modulation techniques []
A) Continuous Wave Modulation
B) Discrete Wave Modulation
C) Pulse Modulation
D) None
4. If sawtooth signal and sinusoidal message signal are given as i/p for comparator,_____ signal will be generated []
A) PAM Signal
B) PWM Signal
C) PPM Signal
D) PCM Signal
5. In_____multiplexing technique time is divided among all the users. []
A) PCM
B) TDM
C) FDM
D) CDMA
6. In_____multiplexing technique total bandwidth is divided among all the users. []
A) PCM
B) TDM
C) FDM
D) CDMA

7. Identify the correct sequence of steps for converting Analog to Digital signal. []
- A) Sampling, Encoding, Quantization B) Encoding, Sampling, Quantization
 C) Encoding, Quantization, Sampling D) Sampling, Quantization, Encoding
8. The process of Rounding (or) Approximating sampled voltages with quantized voltages is called []
- A) Sampling B) Quantization C) Encoding D) None
9. Let sampled voltage is 5.5 volts and quantized voltage is 5 volts. Then quantization error is []
- A) 2 Volts B) 3 Volts C) 0.5 Volts D) 1 Volt
10. QAM is a combination of []
- A) PAM & PCM B) ASK & QPSK C) PCM & DPCM D) None

Fill in the Blanks

10*0.5=5 Marks

- QAM stands for_____
- What are the two drawbacks of delta modulation_____ & _____
- Draw the equivalent digital signal for the digits 11001110_____
- Local oscillator generates_____ signal.
- The process of reconstructing message signal from the modulated signal is called_____
- In pulse modulation techniques carrier signal type is_____ & Message signal type is _____
- Fill the blocks & give proper signal names to generate ASK signal



- The process of transferring an information in the binary form is called_____
- Name the two characteristics of RF amplifier 1) _____ 2) _____
- Name the two type of AM Transmitters 1)_____ 2)_____



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

Internal Question Papers Keys

Course Name: Analog and Digital Communications

Course Code: EC403PC

A.Y.: 2022-23

Semester: II

Course Year / Semester: B.Tech II ECE – B

S.No	Key Paper Link
1	Mid-I Descriptive Paper Key Link: https://drive.google.com/file/d/1NnFKJuA3yBWjvukasw_sQWrvbRpDaZDh/view?usp=sharing
2	Mid-I Objective Paper Key Link: https://drive.google.com/file/d/19RRSPusbpWHX1gHjLhMsTOBBjUSdhaIR/view?usp=sharing
3	Mid-II Descriptive Paper Key Link: https://drive.google.com/file/d/1TxLD930SFxt-_MQv6t16LIRL3HI679rt/view?usp=sharing
4	Mid-II Objective Paper Key Link: https://drive.google.com/file/d/1-6ofK17oF4VpCSE4MtKMpLtkF82Ri48L/view?usp=sharing



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

ASSIGNMENT- 1

Course Name: Analog and Digital Communications

Course Code: EC403PC

Class: B.Tech- II Year ECE – B

A.Y.: 2022-23

Semester: II

- 1) Explain the need for modulation. (C223.1)(Understand)
- 2) Discuss the generation of DSB-SC signal using balanced modulator. (C223.1)(Create)
- 3) Describe the generation of FM signal using Armstrong method. (C223.2)(Analyze)
- 4) Write short notes on Pre-emphasis and De-emphasis. (C223.2)(Remember)
- 5) Illustrate the working of FM transmitter. (C223.3)(Understand)



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

ASSIGNMENT- 2

Course Name: Analog and Digital Communications

Course Code: EC403PC

Class: B.Tech- II Year ECE – B

A.Y.: 2022-23

Semester: II

- 1) Explain Superhetrodyne receiver in detail. (C223.4)(Understand)
- 2) Discuss PCM generation and reconstruction. (C223.5)(Create)
- 3) Explain Delta modulation with neat diagram. (C223.5) (Understand)
- 4) Illustrate ASK modulator. (C223.6)(Understand)
- 5) Write a short note on Eye diagrams.(C223.6)(Remember)



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

Assignment Proofs

Course Name: Analog and Digital Communications

Course Code: EC403PC

A.Y.:2022-23

Semester: II

Course Year / Semester: B.Tech IV ECE – B

S. No	Assignment Number	Assignments Proofs Link
1	Assignment-1	https://drive.google.com/file/d/1qTDMph1v1OyfoKyKIWghOxSB4r1lXdr8/view?usp=sharing
2	Assignment-2	https://drive.google.com/file/d/1iCqTuEymhf1lWOmEOSEbh2hJ2nSohOPL/view?usp=sharing



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

RESULT ANALYSIS TO IDENTIFY SLOW AND ADVANCED LEARNERS

Course Name: Analog and Digital Communications

Course Code: EC403PC

Class: B.Tech- II ECE – B

A.Y.: 2022-23

Semester: II

Slow Learners (From II-I Result Analysis having ≥ 3 backlogs) :

Total 21 slow learners are identified.

Remedial classes are held for improvement of slow learners.

Old and important questions are discussed more.

Home assignments are given regularly.

Counseling is provided regularly.

S.No	Roll Number	No.of Backlogs	MID-I Marks	MID-2 Marks
1	21X31A0440	5S	17	20
2	21X31A0441	4S	14	18
3	21X31A0443	5S	18	22
4	21X31A0445	5S	14	18
5	21X31A0448	5S	21	23
6	21X31A0450	5S	14	18
7	21X31A0453	5S	17	22
8	21X31A0455	4S	20	22
9	21X31A0456	5S	21	21
10	21X31A0457	3S	14	18
11	21X31A0458	5S	15	20
12	21X31A0460	5S	18	22
13	21X31A0470	4S	23	23
14	22X35A0424	4S	20	22

15	22X35A0427	5S	17	20
16	22X35A0428	4S	18	22
17	22X35A0433	5S	16	18
18	22X35A0435	4S	19	22
19	22X35A0436	4S	24	23
20	22X35A0439	3S	20	22
21	22X35A0441	5S	16	18

Advanced Learners (From II-I Result Analysis having ≤ 2 backlogs):

Total 34 advanced learners are identified.

S.No	Roll Number	GATE Material Provided
1	21X31A0438	<p>Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, superheterodyne receivers.</p> <p>Information theory: entropy, mutual information, and channel capacity theorem.</p> <p>Digital communications: PCM, DPCM, digital modulation schemes (ASK, PSK, FSK, QAM), bandwidth, inter-symbol interference.</p>
2	21X31A0442	
3	21X31A0444	
4	21X31A0446	
5	21X31A0447	
6	21X31A0449	
7	21X31A0451	
8	21X31A0452	
9	21X31A0454	
10	21X31A0459	
11	21X31A0461	
12	21X31A0462	
13	21X31A0463	
14	21X31A0464	
15	21X31A0465	
16	21X31A0466	
17	21X31A0467	

18	21X31A0468	
19	21X31A0469	
20	21X31A0471	
21	21X31A0472	
22	22X35A0421	
23	22X35A0422	
24	22X35A0423	
25	22X35A0425	
26	22X35A0426	
27	22X35A0429	
28	22X35A0430	
29	22X35A0431	
30	22X35A0432	
31	22X35A0434	
32	22X35A0437	
33	22X35A0438	
34	22X35A0440	



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

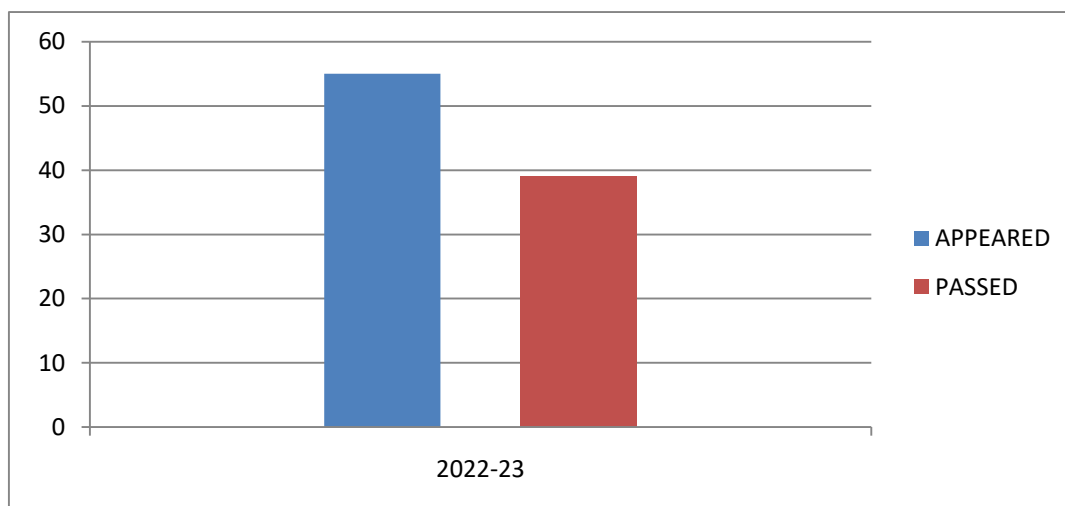
Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

Website: <https://siiet.ac.in/>

B.TECH ECE-II YEAR II SEM - B SECTION RESULT ANALYSIS

ACADAMIC YEAR/ SEMESTER	COURSE NAME	NUMBER OF STUDENTS		QUESTION PAPER SETTING		PASS%
		APPEARED	PASSED	INTERNAL	EXTERNAL	
2022-23 SEMESTER-II	Analog and Digital Communications	55	39	Course Faculty	JNTU Hyderabad	71%

Analog and Digital Communications Result Analysis





SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution under UGC)

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>


DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

REMEDIAL CLASSES TIME TABLE

A.Y 2022-23

SEMESTER-II

BRANCH/ SEC	MON 4.00 PM- 5.00 PM	TUE 4.00 PM- 5.00 PM	WED 4.00 PM- 5.00 PM	THUR 4.00 PM- 5.00 PM	FRI 4.00 PM- 5.00 PM
II ECE-A	EMF&W	LTNM	A&DC	LICA	ECA
II ECE-B	LICA	A&DC	EMF&W	ECA	LTNM
III ECE-A	DSP	VLSID	A&P	ESD	IM
III ECE-B	A&P	ESD	DSP	IM	VLSID
III ECE-C	IM	A&P	ESD	VLSID	DSP
IV ECE-A	WSN	ML	LPVLSID	-	-
IV ECE-B	ML	LPVLSID	WSN	-	-
IV ECE-C	LPVLSID	WSN	ML	-	-


Head of the Department
Electronics and Communication Engg. Dept
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510


PRINCIPAL
Sri Indu Institute of Engineering & Tech
Sheriguda(VIII), Ibrahimpatnam
R R Dist Telangana -501 510



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

Tutorial Topics

Course Name: Analog and Digital Communications

Course Code: EC403PC

Course Year/ Semester: B.Tech II ECE-B

S.No	Unit No.	Topic	No.of Sessions Planned	Teaching Methods/Aids
1	1	Power relations in AM waves	1	BB
2		Generation of SSBSC Waves using frequency discrimination method	1	BB
3	2	Generation of FM Signal using Armstrong Method	1	BB
4		Concept of Pre-emphasis and de-emphasis	1	BB
5	3	Tuned radio frequency receiver	1	BB
6		Simple AGC and Delayed AGC	1	BB
7	4	Pulse Position Modulation & Demodulation	1	BB
8		Delta modulation and Demodulation	1	BB
9	5	QPSK	1	BB
10		Probability of Error for different modulation techniques	1	BB



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electronics and Communication Engineering

Course Outcome Attainment (Internal Examination-1)

Name of the faculty : NARESH SURABU

Academic Year: 2022-23

Branch & Section: ECE - B

Examination: I Internal

Course Name: A&DC

Year: II Semester: II

S.No	HT No.	Q1a	Q1b	Q2a	Q2b	Q3a	Q3b	Q4a	Q4b	Obj1	A1
Max. Marks ==>		5		5		5		5		10	5
1	21X31A0438			5						10	5
2	21X31A0440	3								9	5
3	21X31A0441	5								4	5
4	21X31A0442			5		5				10	4
5	21X31A0443			3						10	5
6	21X31A0444					5		5		10	4
7	21X31A0445	5								4	5
8	21X31A0446			5				5		10	4
9	21X31A0447	5				5				10	4
10	21X31A0448	3		3						10	5
11	21X31A0449							2		9	5
12	21X31A0450					2				7	5
13	21X31A0451			5				5		10	4
14	21X31A0452	5		5						10	4
15	21X31A0453					3				9	5
16	21X31A0454							1		9	5
17	21X31A0455	5								10	5
18	21X31A0456			4		3				9	5
19	21X31A0457	3						2		4	5
20	21X31A0458			2						8	5
21	21X31A0459	5				5				10	4
22	21X31A0460			4						9	5
23	21X31A0461	4						3		9	5
24	21X31A0462	4						4		9	5
25	21X31A0463			5		5				9	5
26	21X31A0464	5						5		9	5
27	21X31A0465			4				3		10	5
28	21X31A0466	3				3				9	5
29	21X31A0467			4				3		9	5
30	21X31A0468	4								7	5
31	21X31A0469			4		5				10	5
32	21X31A0470	4						4		10	5
33	21X31A0471			5		5				10	4
34	21X31A0472	5						5		10	4
35	22X35A0421			3		3				10	5
36	22X35A0422	4		4						10	5
37	22X35A0423	5				5				10	4
38	22X35A0424							5		10	5
39	22X35A0425			3		3				9	5
40	22X35A0426	3						3		10	5

CO	Subj	obj	Asgn	Overall	Level
CO-1	90%	95%	100%	95%	3.00
CO-2	92%	95%	100%	96%	3.00
CO-3	95%	95%	100%	97%	3.00
CO-4					
CO-5					
CO-6					

Attainment Level	
1	40%
2	50%
3	60%

Attainment (Internal 1 Examination) = **3.00**



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electronics and Communication Engineering

Course Outcome Attainment (Internal Examination-2)

Name of the faculty : NARESH SURABU

Academic Year: 2022-23

Branch & Section: ECE - B

Examination: II Internal

Course Name: A&DC

Year: II

Semester: II

S.No	HT No.	Q1a	Q1b	Q2a	Q2b	Q3a	Q3b	Q4a	Q4b	Obj2	A2
	Max. Marks ==>	5		5		5		5		10	5
1	21X31A0438	4				3				10	5
2	21X31A0440			3				3		9	5
3	21X31A0441	4				3				6	5
4	21X31A0442			5				5		9	5
5	21X31A0443	4				4				9	5
6	21X31A0444			5				5		9	5
7	21X31A0445	4						3		6	5
8	21X31A0446			5		5				9	5
9	21X31A0447	5						5		9	5
10	21X31A0448	5				4				9	5
11	21X31A0449			4				4		8	5
12	21X31A0450	4				3				6	5
13	21X31A0451			5				4		9	5
14	21X31A0452					5		5		9	5
15	21X31A0453	4		5						8	5
16	21X31A0454					4		4		7	5
17	21X31A0455	4		5						8	5
18	21X31A0456					4		4		8	5
19	21X31A0457	3		4						6	5
20	21X31A0458					4		4		7	5
21	21X31A0459	5		5						9	5
22	21X31A0460					5		4		8	5
23	21X31A0461	4		5						9	5
24	21X31A0462					4		5		9	5
25	21X31A0463	4		5						9	5
26	21X31A0464			5		5				9	5
27	21X31A0465	5				4				9	5
28	21X31A0466			5				4		8	5
29	21X31A0467					5		4		8	5
30	21X31A0468	4		3						8	5
31	21X31A0469					5		5		9	5
32	21X31A0470	5		4						9	5
33	21X31A0471					5		5		9	5
34	21X31A0472	5		5						9	5
35	22X35A0421	5				4				9	5
36	22X35A0422			5				4		9	5
37	22X35A0423	5				5				9	5
38	22X35A0424			5		4				8	5
39	22X35A0425	4		4						9	5
40	22X35A0426					5		4		8	5
41	22X35A0427			4				4		7	5
42	22X35A0428	5		4						8	5
43	22X35A0429			5		4				9	5
44	22X35A0430	4						3		8	5
45	22X35A0431			5		5				9	5
46	22X35A0432			5				5		9	5

Percentage of students scored more than target	71%
Attainment level	3

3	60%
---	-----

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Department of Electronics and Communication Engineering

Course Outcome Attainment



Name of the faculty NARESH SURABU

Academic Year: 2022-23

Branch & Section: ECE - B

Course Name: A&DC

Year: II

Semester: II

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	3.00		3.00	3.00	3.00
CO2	3.00		3.00	3.00	3.00
CO3	3.00		3.00	3.00	3.00
CO4		3.00	3.00	3.00	3.00
CO5		3.00	3.00	3.00	3.00
CO6		3.00	3.00	3.00	3.00
Internal & University Attainment:			3.00	3.00	
Weightage			25%	75%	
CO Attainment for the course (Internal, University)			0.75	2.25	
CO Attainment for the course (Direct Method)			3.00		

Overall course attainment level

3.00



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

Attendance Register

Course Name: Analog and Digital Communications

Course Code: EC403PC

Course Year/ Semester: B.Tech II ECE – B Section

S.No	Attendance Register Link:
1	https://drive.google.com/file/d/1Kfjftc1iaQWlpUp6vKTNPOcT8Xv44nIv/view?usp=sharing



SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Accredited by NAAC with A+ Grade, Recognized under 2(f) of UGC Act 1956

(Approved by AICTE, New Delhi and Affiliated to JNTUH, Hyderabad)

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

Website: <https://siiet.ac.in/>

Course File Digital Form

Course Name: Analog and Digital Communications

Course Code: EC403PC

Course Year/ Semester: II B.Tech ECE – B Section, II Semester

S.No	Course File Digital Form Link:
1	https://drive.google.com/file/d/1NrFDwofT2b4KVvyu2D6itm8E1Uby2W_a/view?usp=sharing