Jabalpur Engineering College, Jabalpur

Semester VIII Credit Based Grading System (CBGS) w.e.f. July 2018
Scheme of Examination
Bachelor of Engineering B.E. (Electronics & Telecommunication Engineering)
Subject Wise Distribution of Marks and Corresponding Credits
Scheme of Examination w.e.f. July 2018 Academic Session 2018-19

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
			Theory			Practical						
			End. Sem.	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work		L	T	P	
1	EC8001	Advance VLSI	70	20	10	30	20	150	3	1	2	6
2	EC8002	Advance Communication System	70	20	10	30	20	150	3	1	2	6
3	EC8003	Elective-V	70	20	10	-	-	100	3	1	-	4
4	EC8004	Elective-VI	70	20	10	-	-	100	3	1	-	4
5	EC8005	Project-II	-	-	-	120	80	200	-	-	8	8
6	EC8006	Deparatment Choice Industrial (Internal Assessment) Visit	-	-	-	-	50	50	-	-	2	2
7	EC8007	Group Discussion/Seminar (Internal Assesment)	-	-	-	-	50	50	-	-	2	2
		Total	**280**	**80**	**40**	**180**	**220**	**800**	**12**	**4**	**16**	**32**

MST: Minimum of two mid semester tests to be conducted.

L: Lecture **T: Tutorial** **P: Practical**

Department Elective-V (Four Subjects)			Department Elective-VI (Four Subjects)	
S.No.	Subject Code	Subject Name	Subject Code	Subject Name
1	EC8003A	Satellite Communication	EC8004A	Embedded System
2	EC8003B	Principle of Mgt. & Maneg. Eco.	EC8004B	Nano Electronics
3	EC8003C	Robotics & Computer Vision	EC8004C	Customer Relationship Mgt.
4	EC8003D	Quality Management	EC8004D	Speech & Audio Processing

Principal
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EC8001	Advance VLSI	70	20	10	30	20	150	3	1	2	6

Unit - I :

Single-Stage Amplifier: Basic Concepts, Common Source Stage, Source Follower, Common-Gate Stage,Cascode Stage.

Frequency Response of Amplifiers: General Consideration, Common-Source Stage, Source Followers,Common-Gate Stage, Cascode Stage, Differential Pair.

Unit – II :

Differential Amplifier: Single-Ended and Differential Operation, Basic Differential Pair, Common-ModeResponse, Differential Pair with MOS Loads, Gilbert Cell.

Feedback Amplifier: General Consideration, Feedback Topologies, Effect of Loading, Effect of Feedbackon Noise.

Switched-Capacitor Circuits: General Consideration, Sampling Switches, Switched-Capacitor Amplifier,Switched-Capacitor Integrator, Switched-Capacitor Common-Mode Feedback.

Unit - III

Oscillator: General Consideration, Ring Oscillator, Voltage Controlled Oscillator, Mathematical Model ofVCOs.

Phase-Locked Loops: Simple PLL, Charge-Pump PLLs, Nonideal Effects in PLLs, Delayed-Locked Loops.

Unit - IV

Sequential Circuit Design: Introduction, Sequencing Static Circuit, Circuit Design of Latches and Flip-Flops, Static Sequencing Element Methodology.

Array Subsystem: Introduction, SRAM, DRAM, Read-Only Memory, Serial Access Memories, Content-Addressable Memory, Programmable Logic Arrays.

Unit : V

Datapath Subsystems: Introduction, Addition/Subtraction, One/Zero Detector, Comparators, Counters,Boolean Logic Operation, Coding, Shifters, Multiplication, Division, Parallel-Prefix Computations.

References:

1. B. Razavi: Design of Analog CMOS Integrated Circuits, TMH Publication.
2. Weste, Harris and Banerjee: CMOS VLSI Design, Pearson Education
3. J. M. Rabaey, Digital Integrated Circuits, PHI Learning.
4. R. Jacob Baker: CMOS-Circuit Design, Layout and Simulation, Wiley.
5. A. A. Raj and T. Latha: VLSI Design, PHI Learning.

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Understand concept of single stage amplifier
CO2	Designing of Differential and feedback amplifier
CO3	Designing of Oscillator and PLL
CO4	Explain sequential circuit designing
CO5	Elaborate various Data Subsystems

ADVANCE VLSI LAB

(Suggested Exercise)

List of Experiments (Expandable):

Practicals should be performed using any Electronic Design Automation (EDA) - eg. Microwind/ Cadence / Sylvaco / Tanner silicon HiPer / Xilinx ISE 9i or any similar software.

1. Design and simulation of:
(a) Common source amplifier
(b) Source follower amplifier
(c) Common gate amplifier
(d) Cascode amplifier.
2. Estimation of frequency response of: (a) Common source amplifier (b) Source follower
amplifier. (c) Common gate amplifier (d) Cascode amplifier.
3. Design and simulation of differential amplifier.
4. Design and simulation of feedback amplifier.
5. Design and simulation of oscillators: (a) Ring Oscillator (b) L-C Oscillator (c) Voltage
controlled Oscillator.
6. Design and simulation of:
(a) Adder
(b) Subtractor
(c) One/zero detector
(d) Comparator
(e) Counter (f) Multiplier (g) Divider

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		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
EC8002	Advance Communication System	70	20	10	30	20	150	3	1	2	6

Unit-I

Carrier and Symbol Synchronization: Signal parameter estimation, The likelihood function, Carrierrecovery and symbol synchronization in signal demodulation, Carrier phase estimation, Maximumlikelihood carrier phase estimation, The phase locked loop, Effect of additive noise in phase estimation,Decision directed loops, Symbol timing estimation, Maximum likelihood timing estimation, Nondecisiondirected timing estimation, Joint estimation of carrier phase and symbol timing.

Unit-II

Multicarrier Modulation: Data transmission using multiple carriers, Multicarrier modulation withoverlapping subchannels, Mitigation of subcarrier fading, Coding with interleaving over time andfrequency, Frequency equalization, Precoding, Adaptive loading, Discrete implementation ofmulticarrier, The cyclic prefix, Challenges in multicarrier systems, Peak to average Power ratio,Frequency and timing offset.

Unit-III

Multiuser Communications: Introduction to multiple access techniques, Capacity of multiple accessmethods, Code division multiple access, CDMA signal and channel models, The optimum receiver,Suboptimum receivers, Performance characteristics of Detectors, Random access methods, ALOHAsystems and protocols, Carrier sense systems and protocols.

Unit-IV

Orthogonal Frequency Division Multiplexing Systems: Digital-signal-processing-centric implementation of OFDM, Matrix representation of OFDM, Vector coding, PSD of OFDM signal, PARreduction strategies.

Unit–V

Cognitive Networks: Definition, Requirements, Cognitive radio, Cross-layer design, Cognitive process,Cognitive network design.

References:

1. J. G. Proakis: Digital Communications, Mc Graw Hills.
2. A. Goldsmith: Wireless Communications, Cambridge University Press.
3. U. Madhow: Fundamentals of Digital Communication, Cambridge University Press.
4. H. Arslan: Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Synchronize carrier and symbol
CO2	Understand various multicarrier modulation
CO3	Analyze various type of multiuser communication
CO4	Differentiate various multiplexing systems
CO5	Design of Cognitive Network

ADVANCE COMMUNICATION SYSTEM LAB

List of practical's :

1. Write a program to carrier recovery and symbol synchronization in non-coherent FSK demodulation.
2. Implement a multicarrier modulation system in MATLAB and show the advantages of precoding through the simulation results.
3. Implement two PAPR reduction techniques in MATLAB.
4. Implement the optimum receiver for CDMA system.
5. Study the performance characteristics for a CDMA system using MATLAB.
6. Implement the basic OFDM system in MATLAB.
7. Simulate the systems showing the methods a secondary user senses a channel in cognitiveradio environment

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Elective-V EC8003A	Satellite Communication	70	20	10	-	-	100	3	1	-	4

UNIT- I

Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geostationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and**propulsion.**

UNIT -II

Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal controland Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking andcommand. Satellite uplink and downlink Analysis and Design, link budget, E/N calculationperformanceimpairments-system noise, inter modulation and interference, PropagationCharacteristics and Frequency considerations- System reliability and design lifetime.

UNIT - III

Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital
video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, SpreadSpectrum communication, compression – encryption

UNIT - IV

Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna SystemsTVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.**UNIT - V**

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO,MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to homeBroadcast (DTH), Digital audio broadcast (DAB)- Worldspace services, Business TV(BTV),GRAMSAT, Specialized services – E –mail, Video conferencing, Internet

TEXT BOOKS:

1. Dennis Roddy, 'Satellite Communication', McGraw Hill International, 4th Edition, 2006.
2. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, 'Satellite Communication Systems Engineering', Prentice Hall/Pearson, 2007.
3. Satellite Communication by Dr. P. C. Agarwal, Khanna Publishers 2009
4. Design of Geo synchronous Space craft, PHI 1986

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Elective-V EC8003B	Principle of Mgt. & Maneg. Eco.	70	20	10	-	-	100	3	1	-	4

Unit - I

Management Concept: Management, Administration and Organization Difference andRelationship between Organization Management and Administration. Importance ofManagement, Characteristics of Management.

Unit : II

Management: Scientific Management, Principles of Management, Process of Management,Functions of Management, Levels of Management, Project Management.

Unit - III

Decision Making: Introduction and Definition, Types of Decisions, Techniques of DecisionMaking, Decision making under certainty Decision making under uncertainty, Decision Makingunder risk.

Unit - IV

Managerial Economics: Introduction, Factors Influencing Manager, Micro and Macroeconomics,
Theory of the Cost, Theory of the Firm, Theory of Production Function.

Unit - V

Productivity: Input-Output Analysis, Micro-economics Applied to Plants and IndustrialUndertakings, Production and Production system, Productivity, Factors affecting Productivity,Increasing Productivity of Resources.

References:

1. Peter Drucker, Harper and Row: The Practice of Management.
2. Koontz: Essentials of Management, PHI Learning.
3. Staner: Management, PHI Learning.
4. Daft: Principles of Management, Cengage Learning.
5. T. N. Chhabra: Principle and Practice of Management, Dhanpat Rai, New Delhi.
6. Hirschey: Managerial Economics, Cengage Learning.
7. T. R. Banga and S.C. Sharma: Industrial Organisation and Engineering Economics, Khanna
Publishers.
8. O.P. Khanna: Industrial Engineering and Management, Dhanpat Rai.
9. Joel Dean: Managerial Economics, PHI learning.
10. V. L. Mote, Samuel Paul and G.S. Gupta: Managerial Economics Concepts & Cases, TMH,New Delhi

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Understand Characteristics of Management
CO2	Understand Scientific Management
CO3	Understand Decision making process
CO4	Explain theory of cost, firm and product function
CO5	Analyze Production

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Elective-V EC8003C	Robotics & Computer Vision	70	20	10	-	-	100	3	1	-	4

UNIT – I: Basic Concepts Definition and origin of robotics, different types of robotics, various generations of robots, degrees of freedom, Asimov's laws of robotics, dynamic stabilization of robots. 08 16 2 Power Sources Hydraulic, pneumatic and electric drives, determination of HP of motor and gearing ratio, variable speed arrangements, path determination, micro machines in robotics. 08 16 3 Manipulators,

UNIT – II: Actuators and Grippers Construction of manipulators – manipulator dynamics and force control, electronic and pneumatic manipulator control circuits, end effectors, various types of grippers – design considerations. 08 16 4 Kinematics and Path Planning Solution of inverse kinematics problem, multiple solution Jacobean work envelop, hill climbing techniques, introduction to robot programming languages.

UNIT – III: Sensors and Intelligent Robots Introduction to robotic sensors, vision systems, Range detectors, assembly aid devices, force and torque sensors, machine vision, ranging, laser, acoustic, magnetic, fiber optic and tactile sensors.

UNIT – IV: Case Studies Multiple robots, machine interface, robots in manufacturing and non- manufacturing applications, robot cell design, selection of robot. 10 20 Suggested Specification table with Marks (Theory): Distribution of Theory Marks R Level U Level A Level N Level E Level C Level 7 14 14 14 14 7 Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy) Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Text Books 1. Robot Modeling and Control by Spong, M.W., Hutchinson, H., & Vidyasagar, M., John Wiley (Wiley India Ed.), 2006, ISBN-13: 978-0471649908
2. Robotics Engineering – An integrated approach by Klafter R.D., Chimielewski T.A., Negin M., Prentice Hall of India, 1994, ISBN-13: 978-0134687520
3. Introduction to Robotics, by SAHA, Tata McGraw-Hill Education, 2008, ISBN 9781259083204
4. Fundamental of Robotics Analysis and control: by Robert J. Schilling, Prentice Hall, 1996, ISBN- 13: 978-0133444339
5. Robotics Technology and Flexible Automation, by S. R. Deb, Sankha Deb, 2010 McGraw Hill, 2 nd edition, 2010, ISBN: 9780070077911

6. Robotics and Image processing by P.A. Janakiraman, Tata McGraw-Hill, 1995, ISBN 9780074621677
7. Robotics and Control by R. K. Mittal, I. J. Nagrath, Tata-Mcgraw Hill, 2003 Reference Books: 8. Control in Robotics and Automation: Sensor Based Integration (Engineering) B. Ghosh, T. J. Tarn

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Elective-V EC8003D	Quality Management	70	20	10	-	-	100	3	1	-	4

UNIT –I: TOTAL QUALITY MANAGEMENT & QUALITY TOOLS
Evolution of Quality - Historical Perspective, Basic Concepts of Quality, Vision, Mission and Objectives of an Organization, Corporate Structure in an Organization and Role of Quality
UNIT –II: Quality Planning, Quality By Design, Quality Costs and Cost of Failure, Waste Control, How Quality Benefits BusinessQuality and Competitiveness in Business, Zero Defects and Continuous Improvement,
UNIT –III: Role of Leadership and Commitment in Quality Deployment, Team Building, Motivation and Rewards, Total Employee Empowerment, Quality Functions -Measurement, Inspection, Testing, Calibration and Assurance
UNIT –IV: Design Control and Conformity, Tolerance and Variability, PDCA Cycle, Juran Trilogy, Crosby's 10 points and Deming's 14 Points Customers Requirements, Customer-Supplier and Chain Links, Establishing Customer Focus-Customer, Satisfaction, Measurement and Customer RetentionProduct Liability, Total Quality Concepts and CWQC, Difference in Western And Japanese Approach of TQM, Basic Philosophy and Fundamental Models of TQM,
Total Quality and Ethics
UNIT –V Internal Politics and Total Quality Management, Quality Culture, Education and Training3Implementing Total Quality Management -An Integrated System Approach3Total Preventive Maintenance3Self-Assessment, International/National Quality Awards:Malcolm Baldridge Award, Deming Prize,European Award, Rajeev Gandhi Award, CII Exim Award, Jamna Lal Bajaj Award, Golden Peacock Award

References
1.Total Quality Management by N.V.R Naidu, G. Rajendra New Age international, ,First Edition,Jan 2006
2.Total Quality Management by R.S Naagarazan ,New Age international,3e, 2015

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Elective-VI EC8004A	Embedded System	70	20	10	-	-	100	3	1	-	4

UNIT-I :
Embedded Processing Systems – Introduction, Components of Embedded Systems EmbeddedProcessors: Microprocessors, Microcontrollers, DSP and ASICs, Comparative Assessmentof Embedded Processors Pipelining.

UNIT-II :
Memory Devices: ROM family, RAM family, Interfacing memory, Embedded Programming –C and C++, Programming languages for embedded systems: desirable characteristics ofprogramming languages for embedded systems, low-level versus high-level languages.

UNIT- III :
Input-output Ports and Interfacing, I/O Programming Interrupts and their servicing, timingdevices and interfacing, Analog I/O techniques Embedded Communications: Serial Bus, ParallelBus, Networking and Wireless Standards Introduction to Real-Time Operating System (RTOS),
RTOS: memory management.

Unit-IV :
I/O Management and Device Drivers Software Engineering Practices: Embedded Softwaredevelopment process.

UNIT - V :
Hardware-Software Co-design in an embedded system Tools and Trends in Embedded systemsdesign

References

1. Raj Kumar, "Embedded Systems: Architecture, Programming and Design", Tata McGrawHill,Third Reprint, (2003).
2. John Catsoulis, O'Reilly, "Designing Embedded Hardware", First Indian Reprint, (2003).
3. David E. Simon, "An Embedded Software Primer", Pearson Education Asia, Fifth Indian Reprint,(2002).
4. Michael Barr, O'Reilly, "Programming Embedded Systems in C and C ++", (1999).
6. J.W. Valvano, "Embedded Microcomputor System: Real Time Interfacing", Brooks/Cole,2000.
7. Jack Ganssle, "The Art of Designing Embedded Systems", Newnes, 1999.
8. V.K. Madisetti, "VLSI Digital Signal Processing", IEEE Press (NY, USA), 1995.

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Elective-VI EC8004B	Nano Electronics	70	20	10	-	-	100	3	1	-	4

Unit I: Introduction Nanoscale technology: Consequences of the nanoscale for technology and society.Molecular building blocks for nanostructure systems, Nano-scale 1D to 3D structures, Band structure and densityof states at low dimensional structure. Size dependent properties (Elelctrical, mechanical, optical, thermal etc).topdown and bottom up technique, lithographic, nanolithographic and nonlithographic techniques:plused laserdepositon,plasma arc discharge, e-beam sputtering, ball milling , solgel, electrodeposition, chemical vapourdeposition.

Unit II : Characterization technique Scanning probe microscopy: (Principle, construction and working;)Scanning tunnelling microscope, Atomic force microscope, scanning electron microscope, Transmission electronmicroscope, Carbon materials :Allotropes of carbon, Structure of Carbon Nanotubes, types of CNTs-, Electronicproperties of CNTs, Band structure of Graphene ,Band structure of SWNT from grapbene ,electron transportproperties of SWNTs ,

Unit-1II : Introduction to magnetism and superconductivity Basic magnetic phenomena: paramagnetism,ferromagnetism, ferrimagnetism, anti-ferromagnetism;nano-magnetism; giant and colossal magnetoresistance;ferrofluids. Basic superconductivity phenomena; flux quantisation and Josephsoneffects.

Unit - IV : Fundamental of nano eletronics Charging of quantum dots, Coulomb blockade, Quantummechanical treatment of quantum wells, wires and dots, Widening of bandgap in quantum dots, Strong and weakconfinement, spin field effect transistor. single electron transistors, other SET and FET structure.

Unit - V : Silicon MOSFETs Silicon MOSFET: fundamental of MOSFET devices, scaling rules, silicon dioxidebased gate dielectrics, metal gates , junction and contacts, advanced MOSFET concepts

References:

1.G. W. Hanson: Fundamentals of Nanoelectronics, Pearson Education.
2. K. K. Chattopadhyay and A. N. Banerjee: Introduction to Nanoscience and Nanotechnology, PHI Learning.
3. John H. Davis: Physics of low dimension semiconductor, Cambridge Press.
4.K Tu, JW Mayer, LC Feldman, "Electronic Thin Film Science", Macmillan, New York, 1992.
5. Z Cui , "Mico-Nanofabrication", Higher Education press, Springer, 2005.
6.Brian Cantor, "Novel Nanocrystalline Alloys and Magnetic Nanomaterials," Institute of Physics Publications,
2005.
7. S.Chikazumi and S.H. Charap," Physics of Magnetism", Springer-verlag berlin Heideberg, 2005

8.Cao Guozhong, "Nanostructures and Nanomaterials - Synthesis, Properties and Applications", Imperial College
Press, 2004.
9. Sadamichi Maekawa, "Concepts in Spintronics", Oxford University Press, 2006.

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Understand Nanosclae Technology
CO2	Characterize various techniques
CO3	Understand various phenomenon of magnetism and super conductivity
CO4	Explain working of Single Electron Transistor
CO5	Understand Advance MOSFET concepts

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Elective-VI EC8004C	Customer Relationship Mgt.	70	20	10	-	-	100	3	1	-	4

UNIT I: INTRODUCTION

Definitions - Concepts and Context of relationship Management – Evolution - Transactional Vs Relationship Approach – CRM as a strategic marketing tool – CRM significance to the stakeholders.

UNIT II: UNDERSTANDING CUSTOMERS

Customer information Database – Customer Profile Analysis - Customer perception, Expectations analysis – Customer behavior in relationship perspectives; individual and group customer's - Customer life time value – Selection of Profitable customer segments.

UNIT III: CRM STRUCTURES

Elements of CRM – CRM Process – Strategies for Customer acquisition – Retention and Prevention of defection – Models of CRM – CRM road map for business applications.

UNIT IV: CRM PLANNING AND IMPLEMENTATION

Strategic CRM planning process – Implementation issues – CRM Tools- Analytical CRM – Operational CRM – Call center management – Role of CRM Managers.

UNIT V: TRENDS IN CRM

e- CRM Solutions – Data Warehousing – Data mining for CRM – an introduction to CRM software packages.

References:

Costomer Relationship Management By J N seth, P atul G shainesh

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Elective-VI EC8004D	Speech & Audio Processing	70	20	10	-	-	100	3	1	-	4

Unit - I

1.Introduction 2. Short-term analysis-synthesis of (cuasi)periodic signals 3. Modeling and representation of speech signals Learning time: 12h Learning time: 12h Learning time: 12h Theory classes: 6h Self study : 6h Theory classes: 6h Self study : 6h Theory classes: 6h Self study : 6h Course presentation

Unit - II

Audio diversity Characteristics of speech and music. Production model Hearing and auditory modeling The short-time Fourier transform Filter-bank analysis/synthesis. The phase vocoder Filter-bank and spectrogram Time-scale and pitch modification QMF filters. MP3 coding. Production-based all-pole modeling Pitch determination for speech and music LPC-based coding used in mobile telephony Description: Description: Description: Last update: 24-03-2017 230622 –

Unit - III

DSAP - Digital Speech and Audio Processing 4 / 5 Universitat Politècnica de Catalunya 4. Enhancement of speech and audio signals 5. Multi-microphone audio processing 6. Recognition and detection of audio and speech Learning time: 12h Learning time: 12h Learning time: 12h Theory classes: 6h Self study : 6h Theory classes: 6h Self study : 6h Theory classes: 6h Self study : 6h Cancellation: echo, interference Denoising: spectral subtraction, Wiener-based filtering,

Unit - IV

wavelets Blind source separation: ICA, CASA, NMF Room acoustics Array beamforming Acoustic source localization and tracking

Unit - V

Recognition and detection of audio and speech Pattern-matching approaches Audio activity detection Application to speech and speaker recognition Description: Description: Description:

References:

1. Gold, B.; Morgan, N.; Ellis, D. Speech and audio signal processing: processing and perception of speech and music.
2. cv rev. ed. Wiley-Blackwell, 2011. ISBN 978-0-470-19536-9. Dutoit, T.; Marqués, F.; Rabiner,
3. L.R. Applied signal processing: a MATLAB-based proof of concept. New York ; London: Springer, 2009. ISBN 978-0-38774534-3.
4. Rabiner, L.R.; Schafer, R.W. Theory and applications of digital speech processing. Prentice Hall, 2010. ISBN 9780136034285. Huang, Y.A.; for a specific application Oral presentation of 1) Project proposal, and 2) Project realization