

Tulsiramji Gaikwad-Patil College of Engineering and Technology

Wardha Road, Nagpur-441 108

NAAC A+ Accredited

Approved by AICTE, New Delhi, Govt. of Maharashtra

(An Autonomous Institute Affiliated to RTM Nagpur University, Nagpur)



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

**B.Tech. Electronics and Communication
Engineering**

IV Semester

Teaching Scheme & Syllabus

Considering

National Education Policy (NEP) – 2020

From

Academic Year 2024-25

Vision of Institute

To emerge as a learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.

Mission of Institute

- **M1:** To strive for rearing standard and stature of the students by practicing high standards of Professional ethics, transparency and accountability
- **M2:** To provide facilities and services to meet the challenges of Industry and Society
- **M3:** To facilitate socially responsive research, innovation and entrepreneurship
- **M4:** To ascertain holistic development of student and staff members by inculcating knowledge and profession as work practices.

Vision of the Department

“To emerge as a learning Hub and Centre of Excellence in the domain of Electronics and Communication Engineering”.

Mission of the Department

- **M1:** To impart quality technical education through effective teaching learning process.
- **M2:** To provide a platform for addressing societal issues and challenges encountered by industries.
- **M3:** To foster a culture of research and instill innovative and entrepreneurial skills.
- **M4:** To promote lifelong learning in order to foster the holistic development of students and staff through the knowledge and professional ethics.

Program Educational Objectives (PEO)

PEO1: Demonstrate essential technical skills to identify, analyze and solve problems and design issues in Electronics and Communication Engineering.

PEO2: Apply field knowledge, research and professional practices to meet the requirements of industries.

PEO3: Imbibe lifelong learning practices and entrepreneurship skills in tune with emerging technologies.

PEO4: Inculcate professional ethics and managerial skills to satisfy real life problems for serving the needs of society and environment.

Program Outcomes (PO)

Engineering Graduates will be able to:

- 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, review 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 modeling 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, and 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.

Program Specific Outcomes (PSO)

PSO-1: Formulate solutions to intricate engineering problems by applying fundamental principles from the Electronics and Communication Engineering.

PSO-2: Develop methodologies to analyze and design circuits in electronics for communication applications to meet societal needs.

PSO-3: Implement project-based learning techniques to conduct experiments in Embedded Systems, Communication System, Signal and Image Processing, Circuit Analysis and Design.



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SCHEME OF INSTRUCTION & SYLLABI



Programme : Electronics and communication Engineering
Scheme of Instructions: Second Year B.Tech. in Electronics and Communication Engineering

Sr. No.	Course Category	Course Code	Course Title	T/P	Contact Hrs/Week			Credits	Exam Scheme					ESE Duration
					L	P	Hrs		CT-1	CT-2	CA	ESE	TOTAL	
1	PCC	BEC32401	Analog Circuit Design	T	3	0	3	3	15	15	10	60	100	3
2	PCC	BEC32402	Analog Circuit Design Lab	P	0	2	2	1	-	-	25	25	50	2
3	PCC	BEC32403	Signals & Systems	T	3	0	3	3	15	15	10	60	100	3
4	PCC	BEC32404	Signals & Systems Lab	P	0	2	2	1	-	-	25	25	50	2
5	VSEC	BEC32405	Software Lab: Java Programming	P	0	4	4	2	-	-	50	50	100	2
6	AEC	BCE32407	Sustainable Development Goals (SDG)	P	0	4	4	2	-	-	50	50	100	2
7	OE	BEC32408	Open Elective-II	T	2	0	2	2	7	7	6	30	50	2
8	HSSM	BBA32401	Entrepreneurship Development	T	2	0	2	2	7	7	6	30	50	2
9	VEC	BSH32404	Leadership and Team Dynamics	P	0	4	4	2	-	-	50	50	100	2
10	MDM	BIT32416	Data Structure and Algorithm	T	2	0	2	2	7	7	6	30	50	2
Total					12	16	28	20	51	51	238	410	750	

PROGRESSIVE TOTAL CREDITS:61+20=81

Course Category	BSC/ ESC (Basic Science Course/ Engineering Science Course.)	PCC (Programme Core Courses)	PEC (Programme Elective Courses)	(MDM/OEC) Multidisciplinary Minor/ (OEC) Open Elective Course)	SEC/VSEC (Skill Course)	Humanities Science & Management	Experiential Learning	CC (Co Curricular)
Credits	--	8	--	4	6	2	--	--
Cumulative Sum	16 / 13	18	--	10	10	8	2	4

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BOS Chairman
Department of Electronics & Comm
Tulsiramji Gaikwad - Patil College
of Engineering & Technology, Nagpur

[Signature]
Dean Academics
Tulsiramji Gaikwad-Patil
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and Technology, Nagpur

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Dr. Pragati Patil
Vice-Principal
Tulsiramji Gaikwad Patil College of
Engineering & Technology, Nagpur

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Dr. Premanand Naktode
Principal
TGPCET, Nagpur

Open Electives Offered

Open Elective-I (SEM-III)		Open Elective-II (SEM-IV)		Open Elective-III (SEM-V)	
Course code	Course	Course code	Course	Course code	Course
BEC32306	Basic Electronics and Communication	BEC32408	Evolution in Communication Technology	BEC33509	ICT in Rural Sector

Program Electives Offered

Semester V		Semester VI	
Program Elective- I		Program Elective- II	Program Elective- III
BEC33506: Microwave Engineering		BEC33605: Radar Engineering	BEC33608: Wave guide & Antenna
BEC33507: CMOS VLSI Design		BEC33606: HDL Using Verilog	BEC33609: VLSI Signal Processing
BEC33508: Instrumentation and Control System		BEC33607: Industry Automation	BEC33610: PLC & SCADA
Semester VII		Semester VIII	
Program Elective- IV		Program Elective- V	Program Elective- VI
BEC34702: Data Compression & Encryption		BEC34805: Optical Fiber Communication	BEC34808: Satellite Communication
BEC34703: Robotics & Automation		BEC34806: VLSI Testing	BEC34809: Nanotechnology
BEC34704: Mixed Signal Design		BEC34807: Distributed Control Systems	BEC34810: System Security

Course Category	BSC/ (Basic Science Course)	ESC (Engineering Science Course.)	PCC (Program me Core Courses)	PEC (Programme Elective Courses)	Multidiscipline ary Course/OEC	VSEC (Skill Course)	Humanities Science & Management	Experiential Learning Course	CC (Co - curricular)	Semester wise credit
Semester - I	08	08	--	--	--	02	---	--	02	20
Semester - II	08	05	02	--	--	02	02	--	02	21
Semester - III	--	--	08	---	06	--	04	02	--	20
Semester - IV	--	---	08	---	04	06	02	--	---	20
Semester - V	--	--	10	--	10	--	--	--	--	20
Semester - VI	--	--	08	08	02	02	--	--	--	20
Semester - VII	--	--	--	08	--	--	--	12	--	20
Semester - VIII	--	--	08	06	02	04	--	--	--	20
Cumulative Sum	16	13	44	22	24	16	08	14	04	161

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 Dean Academics
 Tulciramji Gaikwad Patil College of Engineering and Technology, Nagpur

[Signature]
 Dr. Pragati Patil
 Vice-Principal
 Tulciramji Gaikwad Patil College of Engineering & Technology, Nagpur

[Signature]
 Dr. Premnand Naktode
 Principal
 TGP CET, Nagpur



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Second Year (Semester-IV) B. Tech. Electronics & Communication Engineering

BEC32401 Analog Circuit Design

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	CT-1	15 Marks
Tutorial	0 Hrs/week	CT-2	15 Marks
Total Credit	3	TA	10 Marks
		ESE	60 Marks
		Total	100 Marks
		Duration of ESE: 03 Hrs 00Min.	

Course Objectives:

- 1 To know fundamentals of operational amplifier
- 2 To aware linear circuits and application of op amp
- 3 To know nonlinear circuits and application of op amp
- 4 To learn regulated & unregulated power supplies.
- 5 To understand oscillators & design of filters

Course Contents

Unit I	Op-Amp Fundamentals: Block diagram of operational amplifier, Differential amplifiers using transistors & its configurations, Op-Amp parameters, virtual ground concept, Ideal OP-Amp, Equivalent circuit, Voltage Transfer curve, Inverting & non inverting configurations.
Unit II	Linear Op Amp Circuits: Voltage follower, Summing amplifier, scaling and averaging amplifier, Subtractor, Instrumentation amplifier and applications, Integrator and differentiators, current to voltage converters, voltage to current converters, Clippers & Clampers. Peak detector, Log and antilog amplifiers and analog multipliers.
Unit III	Nonlinear Op Amp Circuits: Comparators, Schmitt trigger, Precision Rectifier. Multivibrators: Bistable, Monostable, Astable using Op-Amp, Sample/Hold circuits, 555 Timer and its applications, Phase lock loops. D/A (R/R) & A/D conversion circuits (Successive Approximation Method), design of ADC using 0804 ICs.
Unit IV	Unregulated D.C. power supply system with rectifiers and filters, Design of series voltage regulators, design of fixed voltage regulators (IC 78xx and 79xx), adjustable regulators (LM 317, 337), protection circuits for regulators, Design of SMPS (Buck & Boost)
Unit V	OPAMP based Wein Bridge and Phase Shift oscillators, Transistorized Hartley & Colpitts oscillator, Crystal oscillators, Evaluation of figure of merit for all above oscillator circuits. Design of Butterworth Active Filters LPF, HPF, BPF, BRF etc,

Text Books

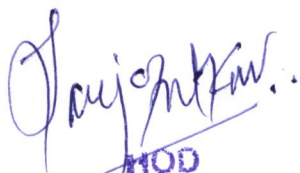
T.1	Ramakant Gaikwad, OPAMPS and Linear Integrated Circuits, PHI/Pearson Education.
T.2	Franco: Designing with Op-Amps (McGraw Hill).
T.3	K.R. Botkar, Integrated Circuits, Khanna Publishers, Delhi

Reference Books

R.1	Linear Integrated Circuits Marnal I, II, and III: National Semiconductor
R.2	Regulated Power supply Handbook. Texas Instruments.

R.3	Operational Amplifier Design and Applications Tobey, Graham, Huelsman McGraw Hill.
Useful Links	
1	https://nptel.ac.in/courses/117/105/117105147/
2	https://nptel.ac.in/courses/117/107/117107094/
3	http://nptel.ac.in/courses/117103064

	Course Outcomes	CL
BEC2401.1	Explain the basic principle of operational amplifier, parameters, and its configurations.	4
BEC2401.2	Illustrate linear op-amp circuits and their applications.	4
BEC2401.3	Determine non-linear op-amp circuits and their applications	3
BEC2401.4	Examine Power Supplies.	3
BEC2401.5	Analyze Oscillators and filters.	4



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B.Tech Second Year (Semester-IV) Electronics and Communication Engineering

BEC32403 : Signals and Systems

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	CT-1	15 Marks
Tutorial	-	CT-2	15 Marks
Total Credit	3	CA	10 Marks
		ESE	60 Marks
		Total	100 Marks
		Duration of ESE: 03 Hrs 00 Min.	

Course Objectives:

- To Interpret the students how to represent continuous time signals and LTI systems in time domain.
- To Examine the students about Fourier series Linear Combinations of Harmonically Related Complex Exponentials.
- To apply the Fourier transform on continuous time signal with phase spectrum and magnitude spectrum.
- To Express the student how to apply Laplace Transform of continuous signal.
- To Examine the students Information Theory Of Encoding And Decoding Of Data.

Course Contents

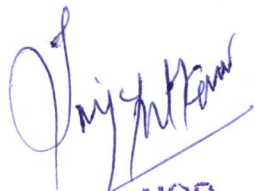
Unit I	CONTINUOUS-TIME SIGNALS AND SYSTEMS: Signals, Signal Energy and Power, Transformations of the Independent Variable, Periodic Signals, Even and Odd Signals, Exponential and Sinusoidal Signals, LTI Systems: The Convolution Integral/ Sum Complex Exponential and Sinusoidal Signals, Systems and Properties
Unit II	FOURIER SERIES: The Response of LTI Systems to Complex Exponentials, Fourier Series Representation, Linear Combinations of Harmonically Related Complex Exponentials, Determination of the Fourier Series Representation, Convergence of the Fourier Series, Properties, Parseval's Relation.
Unit III	CONTINUOUS FOURIER TRANSFORM: Fourier Transform Representation, Condition Of Existence Of Fourier Transform, Phase Spectrum and Magnitude Spectrum, Properties of Fourier Transform, Linearity, Time Shifting, Frequency Shifting Frequency Translation Theorem Signum Function, Sine Function, Cosine Function
Unit IV	LAPLACE TRANSFORMATION: Introduction, Properties of Laplace Transform, First Shifting theorem, Laplace Transform of derivatives and integrals, Second Shifting Theorem, Periodic Functions, Inverse Laplace Transform.
Unit V	INFORMATION THEORY : Basic Of Information Theory, Entropy of Source, Maximum Entropy, Source Encoding, Discrete Memoryless Source, Huffman coding, Average Code Word, Entropy, Efficiency, Redundancy, Hamming Distance, Hamming Weight.


Text Books

T.1	Systems and Systems- BPB PUBLICATION, 2013
T.2	Systems and Systems Nagrath I J; Sharan S N; Ranjan R
T.3	Systems and Systems Parthasarathy Haris I.K. International P.Ltd

Reference Books	
R.2	Text Reference On Signals And Systems Shah D.D Bhagali A.C Shashidhar H.L Shah D.D Bhagali A.C Shashidhar H.L
Useful Links	
1	https://nptel.ac.in/courses/108/104/108104139/
2	http://nptel.ac.in/courses/117107095

Course Code	Course Outcomes	CL
BEC32403.1	Interpret Continuous -Time Signals Analytically And Visualize Them In The Time Domain.	2
EC32403.2	Apply Fourier Series On Continuous Time Signals.	3
EC32403.3	Implement Fourier Transform And Verify Its Properties.	3
EC32403.4	Examine Laplace Transformation and its Properties.	4
EC32403.5	Analyze Information Theory Of Encoding And Decoding Of Data	4


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Second Year (Semester-IV) B. Tech. Electronics & Communication Engineering

BIT32416: Data Structure and Algorithm

Teaching Scheme		Examination Scheme	
Lectures	2Hr/Week	CT	14
Tutorials	-	CA	6
Total Credits	2	ESE	30
		Total	50
		Duration of ESE: 03Hrs	

Course Objectives:

1	To develop an understanding of algorithm design and complexity analysis to create efficient and optimized solutions for computational problems using suitable data structures.
2	To introduce the concepts of abstract data types (ADTs) and their applications in problem-solving, focusing on efficient data representation, processing, and management.
3	To familiarize students with dynamic memory allocation and advanced data structures such as linked lists and trees, enabling them to perform operations and address problems.

Course Contents

Unit I	Data Structures: Introduction to Data Structures, Need of Data Structure, Abstract Data type, Types Of Data Structures Algorithms: Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations (Big O, Omega Ω , Theta), Time-Space trade-off. Searching- Linear & Binary Search, Sorting- Bubble Sort, Insertion Sort, Selection Sort, Algorithm design strategies - Divide and Conquer strategy, Merge Sort, Quick Sort, complexity analysis of sorting methods.	9
Unit II	Abstract Data Types (ADTs) Arrays : Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays Stacks- Introduction, PUSH and POP operations on Stacks, Prefix, Infix & Postfix expressions- Conversion and Evaluation, Multiple Stacks. Queues- Introduction, Insertion & deletion in Queues, Circular Queues, Priority Queues.	9
Unit III	Linked List- Linked List as ADT: Dynamic Memory Allocation Functions, Types of Linked Lists- (single, double, circular), Operations on Linked Lists- (create, insert, delete, reverse etc.), Applications of Linked List- Polynomial Representation (Addition/deletion/multiplication of two polynomials). Trees- Introduction, Implementation of Trees, Tree Traversals with an Application, Binary Trees, BST- Insertion & Deletion, Expression Trees, AVL Trees, Heap Trees.	9

Text Books

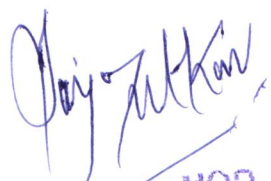
T.1	Pandey, "Data structure and algorithm", harimohan university science, press 1 reprint.
T.2	Puntambekara, "Data structure and algorithm" a.technical publications, 2 revise.
T.3	sane shirish s "Data structure and algorithm"; deshpendeneeta a. Technical publications, 1 revise.

Reference Books

R.1	jean - paul ; sorensonpaul g , "An intro. To data structures with application tremblay" .Tata mcgraw hill
R.2	niklausprentice , "Algorithms + data structures = programswirth", hall of india

Useful Links	
1	https://nptel.ac.in/courses/106102064
2	https://onlinecourses.nptel.ac.in/noc22_cs40

	Course Outcomes	CL
BIT32416.1	Analyze complexity and data structures to implement efficient algorithms.	4
BIT32416.2	Determine abstract data types to efficiently solve problems involving data representation, expression and queue management.	3
BIT32416.3	Illustrate dynamic data structures, perform operations, and solve problems by utilizing linked lists and trees.	4



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Second Year (Semester-IV) B.Tech. Electronics & Communication Engineering

BEC32409: Evolution in Communication Technologies

Teaching Scheme		Examination Scheme	
Lectures	2Hrs/week	CT-1	7 Marks
Tutorial	0Hrs/week	CT-2	7 Marks
Total Credit	2	CA	6 Marks
		ESE	30 Marks
		Total	50 Marks
		Duration of ESE: 02 Hrs 00 Min.	

Course Objectives:

- 1 To remember the history and basic concept of communication technology
- 2 To understand the evolution, communication standards in communication technologies
- 3 To learn the fiber optical structure and advantages.

Course Contents

Unit I	Introduction to Communication Technologies: Overview of communication systems, Block diagram of communication system. Historical evolution of communication technologies: Telegraph, telephone and Radio systems. Basic concept: signals, frequency, bandwidth, and modulation
Unit II	Wireless Communication Technologies: Evolution from 1G to 6G. Mobile communication systems and standards (GSM, CDMA, LTE). Basics of satellite communication. Wi-Fi, Bluetooth, and other short-range communication technologies.
Unit III	Fiber Optics: Basics of Optical Communication, Advantages of Fiber Optic Systems, Optical Fiber Structures Core, Cladding, and Buffer Coating. Advantages of fiber Optic communication. Types of Optical Fibers Single-Mode and Multi-Mode Fibers, Application of optical fiber

Text Books

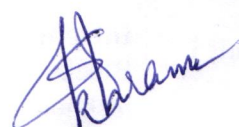
- | | |
|-----|--|
| T.1 | Tse, david; viswanath, pramod, 'fundamentals of wireless communication', university press, reprint |
| T.2 | Keiser gerd, optical fiber communications, Tata mcgraw hill, 4 reprint |
| T.3 | Couch, leon, w, digital and analog communication systems, pearson education, 6 |

Reference Books

R.1	"Principles of Communication Systems" by Herbert Taub and Donald Schilling
R.2	"Wireless Communications and Networking" by Vijay Garg
R.3	Fiber Optic Communications by Joseph C. Palais
Useful Links	
L.1	https://archive.nptel.ac.in/courses/117/104/117104127/
L.2	https://archive.nptel.ac.in/courses/108/106/106106167/

	Course Outcomes	CL
BEC32409.1	Determine the historical and technological progression in communication.	3
BEC32409.2	Illustrate the functioning of wireless communication systems and standards such as GSM, CDMA, and LTE.	3
BEC32409.3	Analyze an Optical Communication Systems and its application	4


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Second Year(Semester-IV) B.Tech. Electronics & Communication Engineering

BBA32401: Entrepreneurship Development

Teaching Scheme		Examination Scheme	
Lectures	2Hrs./week	CIE	20 Marks
Tutorial	-	ESE	30 Marks
Total Credit	2	Total	50 Marks
		Duration of ESE: 02Hrs. 00Min.	

Course Objective:

1	Student will be able to understand the concept of entrepreneurship and what entrepreneurs do.
2	Student will learn how entrepreneurship evolved from its earlier disorganized form to the current Government-supported form.
3	Student will be able to explain how the entrepreneurial knowledge gained can be applied to developing entrepreneurial ventures in different economic sectors in India.

Course Contents

Unit I	Evolution of the concept of entrepreneurship, The entrepreneur: Characteristics and functions, types of entrepreneurs, distinction between manager and an entrepreneur, Entrepreneur: Concept, characteristics, barriers, entrepreneurial climate, and culture.
Unit II	Post-independence growth of entrepreneurship in India, Role of entrepreneurship in economic development, Entrepreneurship development programs: Objectives, phases, evaluation, and problems of EDPs.
Unit III	Women entrepreneurship in India, problems of women entrepreneurship, Rural entrepreneurship in India and its importance, problems of rural entrepreneurship, Entrepreneurship in various sectors: Tourism, agriculture, and social.

Text Books

1	T.1 Entrepreneurship Development, S. Anil Kumar, New Age International, 2008, ISBN 8122414346, 9788122414349.
2	T.2 Entrepreneurship: A South-Asian Perspective, Kuratko, T.V. Rao, Cengage Learning, 2012
3	T.3 Entrepreneurship Development, Satish Taneja, Himalaya Publishing House, 2012

Reference Books

1	R.1 Entrepreneurial Development, S.S. Khanka, S. Chand & Co., 2016
2	R.2 Entrepreneurial Development, Satish Taneja, Himalaya Publishing House, 2010, pages 64–75
3	R.3 Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, pages 46–66

Useful Links

<https://nptel.ac.in/courses/110/101/110101131/>

BBA32401	Course Outcomes	CL
BBA32401.1	Explain the evolution of the concept of entrepreneurship, characteristics and functions, types of entrepreneurs,	4
BBA32401.2	Discover post-independence growth of entrepreneurship in India, role of entrepreneurship in economic development.	3
BBA32401.3	Distinguish entrepreneurship in various sectors: tourism, agriculture, and social.	4

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Second Year (Semester-IV) B.Tech. Electronics & Communication Engineering

BCE32408: Sustainable Development & Goals

Teaching Scheme			Examination Scheme	
Lectures	2Hrs/week		CT-1	-
Tutorial	0Hrs/week		CT-2	-
Total Credit	2		CA	25 Marks
			ESE	25 Marks
		Total	100 Marks	
		Duration of ESE: 02 Hrs 00 Min.		

Course Objective

- 1 To understand and learn the importance and Pillars of sustainability.
- 2 To learn the concept, meaning, scope of sustainability development.
- 3 To understand the challenges, concept, implication and issues in sustainable development

Course Contents

Unit I	Sustainability Definitions – Importance of sustainability goals of sustainability – History of sustainability – Three Pillars of Sustainability – Theories of Sustainability: Systems Theory, Popular sustainability theory, and Ideal scientific model - Issues and Challenges relating to sustainability.
Unit II	Sustainable Development Concept, meanings, scope, and definitions of sustainable development – Principle of Sustainable Development – The pillars of sustainable development – Approaches to Sustainable Development: Status Quo Approach, Community Capacity Building Approach, Industrial Sector Approach, Integrated Systems Approach, Human Development Approach, and Green Account Approach.
Unit III	Challenges in Sustainable Development Diversity and Social Exclusion: Concept and implications, human development of the sociocultural and other ethnic groups of the society; Contemporary Issues of Development – Bottom of the pyramid approach; Understanding the importance of social capital, social mobilization, social security, and population stabilization.

Text Books


- T.1 | hussain,azmal icfai,Biodiversity for sustainable development, Reprint


Reference Books

- R.1 | Lekhi R K (2013), The Economics of development and Planning, Kalyani Publishers
- R.2 | Kaul, V. &Sankar, D. (2009). Early Childhood Care and Education in India. New Delhi: NUEPA.

R.3	Fiber Optic Communications by Joseph C. Palais
Useful Links	
L.1	https://archive.nptel.ac.in/courses/109/106/109106200/

	Course Outcomes	CL
BCE32408.1	Understand the three pillars of sustainability and theories of sustainability	2
BCE32408.2	Determine the concept of sustainable development, theories of sustainability	3
BCE32408.3	Analyze the contemporary issues of sustainable development	4


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Second Year (Semester-IV) B. Tech. Information Technology

BSH32404-Leadership and Team Dynamics

Teaching Scheme		Examination Scheme	
Theory	2 Hrs/week	CT-I	7 Marks
Tutorial	-	CT-II	7 Marks
Total Credits	2	CA	6 Marks
		ESE	30 Marks
		Total	50 Marks
		Duration of ESE: 2Hrs	

Course Objectives:

1. To provide a framework for the students to understand the importance of Leadership and team effectiveness in organizations.
2. To develop an understanding of the interpersonal processes and group dynamics.
3. To provide a theoretical understanding of leadership practices in organizations.

Course Contents

Unit I	Introduction to Leadership & Team Management: Leadership Myths; Interactional Framework for analyzing leadership; Leadership Development: The First 90 Days as a Leader; Leader Development- The Action-Observation-Reflection Model, LMX Theory and Normative Decision Model; Situational Leadership Model; Contingency Model and Path Goal Theory; Emotional Approach Charismatic and Transformational Leadership; Leadership for Tomorrow
Unit II	Leadership Attributes: Personality Traits and Leadership: Personality Types and Leadership; Intelligence and Leadership; Emotional Intelligence and Leadership, Power and Leadership: The art of influence in leadership; Leadership and "Doing the Right Things: Character-Based Approach to Leadership; Role of Ethics and Values in Organisational Leadership
Unit III	Leadership Behaviour: Leadership Pipeline, Assessing Leadership Behaviors: Multi-rater Feedback Instruments: The Dark Side of; Leadership- Destructive Leadership; Managerial Incompetence and Derailment Conflict Management, Negotiation and Leadership, Leadership under a crisis situation: The Situation and the Environment: Culture and Leadership: Global Leadership.

Text Books

T.1	Leadership: Enhancing the lessons of experience by Hughes, R.L., Ginnett, R.C., & Curphy, G.J. (2019), 9th Edition, McGraw Hill Education, Chennai, India.
T.2	Robbins, S.P. Judge, T.A. & Vohra, N., "Organizational Behavior," 18th Ed, Pearson Education. (2019)

Reference Books	
R.1	Baron R. A. and Byrne D., "Social Psychology", 10th Ed., Pearson Education, Inc. (2004)
R.2	Luthans F., "Organizational Behavior", 10th Ed., McGraw-Hill Companies. (2004)
Useful Links	
1	https://onlinecourses.nptel.ac.in/noc22_mg39/preview
2	https://www.summary.com/book-summary/the-first-90-days



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Second Year (Semester IV) B.Tech Electronics & Communication Engineering

BEC32402: Analog Circuit Design Lab

Teaching Scheme		Examination Scheme	
Lectures	2Hr/Week	CT	-
Tutorials	-	CA	25 Marks
Total Credits	1	ESE	25 Marks
		Total	50 Marks
Duration of ESE:02Hrs			

Course Objectives:

1	To know fundamentals of operational amplifier
2	To aware linear circuits and application of op amp
3	To know nonlinear circuits and application of op amp
4	To learn regulated & unregulated power supplies.
5	To understand oscillators & design of filters

Sr. No.	List of Experiment	CO
1	Analyze Frequency response of Inverting & Non inverting Op Amp Using IC 741	CO1
2	Implement Adder & Subtractor Circuit using Op Amp	CO2
3	Analyze input & output waveform of Integrator & Differentiator Circuit using Op Amp	CO2
4	Observe waveform of clipper & clamper circuit using Op Amp	CO2
5	Observe waveform of Schmitt trigger circuit as square wave generator.	CO3
6	Observe waveform of function generator using Op Amp (Sine, Square, Triangular)	CO3
7	Design astable Multivibrator using Op amp IC 741.	CO3
8	Design astable Multivibrator using IC 555 timer	CO3
9	Implement series & shunt voltage regulators.	CO4
10	Analyze active filters circuit LPF, HPF, BPF, BRF	CO5

Text Books

T.1	Ramakant Gaikwad, OPAMPS and Linear Integrated Circuits, PHI/Pearson Education.
T.2	Franco: Designing with Op-Amps (McGraw Hill).
T.3	K.R. Botkar, Integrated Circuits, Khanna Publishers, Delhi

Reference Books

R.1	Linear Integrated Circuits Mannal I, II, and III: National Semiconductor
R.2	Regulated Power supply Handbook. Texas Instruments.
R.3	Operational Amplifier Design and Applications Tobey, Graham, Huelsman McGraw Hill.

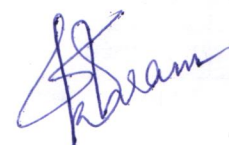
Useful Links

1	https://nptel.ac.in/courses/117/105/117105147/
2	https://nptel.ac.in/courses/117/107/117107094/
3	http://nptel.ac.in/courses/117103064

	Course Outcomes	CL
BEC32402.1	Explain the basic principle of operational amplifier, parameters, and its configurations.	4
BEC32402.2	Illustrate linear op-amp circuits and their applications.	4
BEC32402.3	Determine non-linear op-amp circuits and their applications	3
BEC32402.4	Examine Power Supplies.	3
BEC32402.5	Analyze oscillators and filters.	4



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Second Year (Semester-IV) B.Tech. Electronics & Communication Engineering

BEC32404: Signal And System Lab

Teaching Scheme		Examination Scheme	
Practical	2Hrs/week	CA	25 Marks
Total Credit	1	ESE	25 Marks
		Total	50 Marks
		Duration of ESE:02Hrs00Min.	

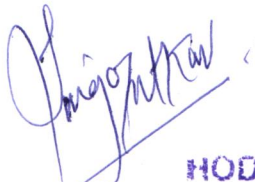
Course Outcomes(CO)

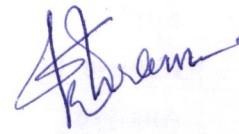
Students will be able to

- 1 **Identify** Continuous -Time Signals Analytically And Visualize Them In The Time Domain.
- 2 **Apply** Fourier Series On Continuous Time Signals.
- 3 **Implement** Discrete Fourier Transform And Verify Its Properties.
- 4 **Analyze** Information Theory Of Encoding And Decoding Of Data
- 5 **Examine** Error Correcting Code Of Data

Sr.No.	List of Experiment	CO
1	Write a MATLAB program to perform some basic operation on matrices such as addition, subtraction, multiplication.	CO1
2	Performs operations on signals and sequences such as addition, multiplication, scaling, shifting, folding,	CO2
3	Write a "MATLAB" Program to generate various signals and sequences, such as unit impulse, unit step, unit ramp, sinusoidal,	CO2
4	Verification of Perceval theorem associated with Fourier series analysis for a periodic square wave sampled using appropriate sampling frequency.	CO3
5	Verification of Multiplication property associated with Fourier series analysis for a periodic triangular wave sampled using appropriate sampling frequency	CO3
6	Verification of the sampling theorem	CO3
7	Compute discrete Fourier transform of a signal.	CO4
8	Obtain Fourier Transform and Inverse Fourier Transform of a given signal / sequence and to plot its Magnitude and Phase Spectra.	CO4
9	Find the Laplace Transform of co-sine Function	CO5
10	Determine the Huffman code of given sequence of data.	CO5

Text Books	
T.1	Systems and Systems- BPB PUBLICATION , 2013
T.2	Systems and Systems Nagrath I J; Sharan S N; Ranjan R
T.3	Systems and Systems Parthasarathy Haris I.K. International P.Ltd
Reference Books	
R.2	Text Reference On Signals And Systems Shah D.D Bhagali A.C Shashidhar H.L Shah D.D Bhagali A.C Shashidhar H.L
Useful Links	
1	https://nptel.ac.in/courses/108/104/108104139/
2	http://nptel.ac.in/courses/117107095
Text Books	
T.1	Systems and Systems- BPB PUBLICATION , 2013
T.2	Systems and Systems Nagrath I J; Sharan S N; Ranjan R


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Second Year (Semester-IV) B.Tech. Electronics & Communication Engineering

BEC32405: Software Lab: Java Programming

Teaching Scheme		Examination Scheme	
Lectures	4Hr/Week	CT	-
Tutorials	-	CA	50 Marks
Total Credits	2	ESE	50 Marks
		Total	100 Marks
		Duration of ESE: 02Hrs	

Course Objectives:

1	Set up and validate the Java programming development environment.
2	Understand and apply conditional and looping constructs in Java.
3	Demonstrate the concepts of methods and constructors in Java.
4	Explore inheritance and its types in Java.
5	Implement and handle exceptions effectively in Java.

Sr.No.	List of Experiment	CO
1	Implement Setup for Java programming development environment and test using small program.	CO1
2	Implement a programs to demonstrate use of "if" statement and its different forms.	CO2
3	Develop programs to demonstrate use of looping statement 'for'	CO2
4	Execute a program using Method overloading	CO3
5	Execute a program for the concept of class constructor and its types in JAVA	CO3
6	Develop a program to implement this keyword in Java	CO3
7	Execute a program for implementation of Single and Multilevel inheritance.	CO4
8	Execute a program for implementation of multiple inheritance.	CO4
9	Develop a program for Java Exception Handling using finally block	CO5
10	Implement program for Exception handling using try...catch	CO5

Text Books

T.1	Herbert Schildt "Java: The Complete Reference".
T.2	Balagurusamy ,Programming with Java".
T.3	Horstmann , "Core Java for the Impatient".

Reference Books

R.1	Bruce Eckel "Thinking in Java"
R.2	Paul Deitel, Harvey Deite "Java 9 for Programmers".
R.3	Bart Baesens, Aimee Backiel, and Seppe vanden Broucke "Beginning Java Programming: The Object-Oriented Approach "

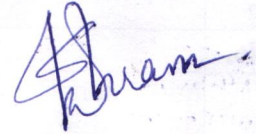
Useful Links	
1	https://nptel.ac.in/courses/106/102/106102064/
2	https://nptel.ac.in/courses/106/106/106106145/
3	https://nptel.ac.in/courses/106/105/106105085/

	Course Outcomes	CL
BEC32405.1	Execute the setup for Java programming.	3
BEC32405.2	Implement programs that demonstrate the use of the 'if' statement & 'for' loop.	3
BEC32405.3	Execute Java programs on method overloading, class constructors and this keyword.	3
BEC32405.4	Verify single and multilevel inheritance as well as multiple inheritance.	5
BEC32405.5	Execute a program exception handling techniques.	3



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