

Detailed Syllabus Lab-wise Breakup

Course Code	18B15EC212	Semester Even	Semester IV Session 2019-2020 Month from Jan to June
Course Name	<i>Analog and Digital Communication Lab</i>		
Credits	1	Contact Hours	2 Hrs per week

Faculty (Names)	Coordinator(s)	Rahul Kaushik , Yogesh Kumar
	Teacher(s) (Alphabetically)	Ajay Kumar, Ashish Goel, Neetu Joshi, Reema Budhiraja, Vimal Kumar Mishra

COURSE OUTCOMES		COGNITIVE LEVELS
C272.1	Design of circuits for analogue modulation/demodulation techniques.	Analyzing (C4)
C272.2	Understand the concepts of sampling process, and time division multiplexing.	Understanding (C2)
C272.3	Design and implement digital modulation techniques.	Analyzing (C4)
C272.4	Implementation of modulation techniques using MATLAB.	Applying (C3)

Module No.	Title of the Module	List of Experiments	CO
1.	Analogue modulation/demodulation	Implement amplitude modulation and DSB-SC modulation circuit using IC AD633 & calculate modulation index for various modulating signals and study the over, exact and under modulation.	CO1
2.	Analogue modulation/demodulation	Demodulate amplitude modulated signal using Envelope detector.	CO1
3.	Analogue modulation/demodulation	Design a Frequency modulation (FM) circuit using IC XR 2206 and determine the frequency deviation and modulation index.	CO1
4.	Frequency mixer	Design a Frequency mixer circuit using ICAD633	CO1
5.	Sampling	Design a circuit to sample a given signal using IC LF398 and reconstruct the signal from sampled waveform	CO2
6.	Multiplexing	Study of TDM with different receiver	CO2

		synchronization techniques	
7.	Digital modulation/demodulation techniques	Implement and Test Amplitude Shift Keying Circuit using IC LF 398	CO3
8.	Digital modulation/demodulation techniques	Implement and Test Frequency Shift Keying Circuit using IC LF 398	CO3
9.	Digital modulation/demodulation techniques	Implement and Test Phase Shift Keying Circuit using IC LF 398.	CO3
10.	Digital modulation/demodulation techniques	Study of Pulse Code Modulator (PCM) and Demodulator.	CO3
11.	Digital modulation/demodulation techniques	Study of Delta Modulation and Demodulation	CO3
12.	Digital modulation/demodulation techniques	Generation & detection of ASK, FSK & PSK using trainer kit	CO3
13.	Software implementation of digital modulation/demodulation techniques	Implement amplitude modulation using MATLAB simulation	CO4
14.	Software implementation of digital modulation/demodulation techniques	Implement ASK and PSK modulation using MATLAB simulation	CO4
Evaluation Criteria		Assessment Components (ACs)	
Components	Maximum	AC1. Identification of components to be used & correct Implementation of circuit on bread board/KIT	
Viva 1(Mid Sem Viva)	20	AC2. Reading and trace work	
Viva 2(End Sem Viva)	20	AC3. Understanding of the experiment	
Assessment Components	30	AC4. Lab Record Assessment	
Attendance	15		
Lab Record	15		
Total	100		

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Lathi B.P, Modern Digital and Analog Communication Systems, 5 th /ed ,Oxford University Press, 2018
2.	S.Haykin, Digital Communication Systems ,John Wiley & Sons, 2013
3.	Lab Manuals

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B1NHS431	Semester : EVEN	Semester IV Session 2019-2020 Month: January 2020 to June 2020
Course Name	Introduction to Literature		
Credits	3	Contact Hours	3 (2-1-0)

Faculty (Names)	Coordinator(s)	Dr. Monali Bhattacharya (Sector 62) & Dr. Ekta Srivastava (Sector 128)
	Teacher(s) (Alphabetically)	Dr. Ekta Srivastava , Dr. Monali Bhattacharya

COURSE OUTCOMES		COGNITIVE LEVELS
C206-5.1	Understand figurative language to demonstrate communication skills individually and in a group.	CL-2 Understanding
C206-5.2	Develop a critical appreciation of life and society through a close reading of select texts.	CL-3 Applying
C206-5.3	Analyse a literary text thematically and stylistically and examine it as representing different spectrum of life, human behavior and moral consciousness of society.	CL-4 Analysing
C206-5.4	To interpret Literature as reflection of cultural and moral values of life and society.	CL-5 Evaluating

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to Literature & Genres	Introduction Literary Genres Literary Devices Learning Communication Skills through Literature	5
2.	Poems	On His Blindness: John Milton My Last Duchess: Robert Browning "Hope" is the thing with feathers: Emily Dickinson A Prayer before Birth: Louis MacNeice Goodbye Party for Miss Pushpa T.S.: Nissim Ezekiel	6
3.	Prose & Short Stories	The Spectator Club: Richard Steele Evidence: Isaac Asimov Toba Tek Singh: Saadat Hasan Manto	6
4.	Plays & Drama	Andher Nagari Chaupat Raja: Bhartendu Harishchandra The Characters of Macbeth & Lady Macbeth as Universal Characters. Arms & The Man: G B Shaw	7
5.	Novel	To Sir With Love: E.R. Braithwaite	4

Total number of Lectures		28
Evaluation Criteria		
Components	Maximum Marks	
T1	20	
T2	20	
End Semester Examination	35	
TA	25 (Assignment, Seminar/Presentation , Oral Questions)	
Total	100	

Recommended Reading material:	
1	M.H. Abrams, 'A Glossary of Literary Terms', 7 th Edition, Hienle & Hienle: Thomson Learning, USA, 1999
2	Mark William Roche, 'Why Literature matters in the 21 st Century', First Edition, Yale University Press, 2004.
3	E.R. Braithwaite, 'To Sir With Live', First Edition, Bodley Head, UK, 1959. Susie Thomas(Ed), "E. R. Braithwaite: 'To Sir, with Love' – 1959", Available at http://www.londonfictions.com
4	Khalid Hasan (Translator), 'Saadat Hasan Maanto : Toba Tek Singh' Reprint, Penguin Books, India, 2008.
5	G.B Shaw, 'Arms & The Man', Paperback, 2013 https://onemorelibrary.com/index.php/en/?option=com_djclassifieds&format=raw&view=download&task=download&fid=10428
6	Anon, (n.d.). <i>The Spectator Club. Sir Richard Steele. 1909-14. English....</i> [online] Available at: http://www.bartleby.com/27/7.html [Accessed 2018].
7	<i>All poems online: http://www.poetryfoundation.org</i>
8	Wolfgang Clemen , 'Shakespeare's Soliloquies', First Edition, Routledge , London, 1987.

Detailed syllabus
Lecture-wise Breakup

Subject Code	15B1NHS432	Semester: Even	Semester IV Session 2019-2020 Months: from Jan to June
Subject Name	INTRODUCTION TO PSYCHOLOGY		
Credits	3	Contact Hours	(2-1-0)
Faculty (Names)	Coordinator(s)	Dr. Badri Bajaj and Dr. Ruchi Gautam	
	Teacher(s) (Alphabetically)	Dr. Badri Bajaj Dr. Ruchi Gautam	

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Demonstrate a basic understanding of different perspectives and concepts of psychology	Understanding (Level 2)
CO2	Apply the concepts of psychology in day to day life	Applying (Level 3)
CO3	Examine the different theoretical perspectives and models of psychology	Analyzing (Level 4)
CO4	Develop solutions for problems related to psychology using appropriate tools/models	Creating (Level 6)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Introduction to Psychology	Definition, Nature, and Scope of Psychology; Approaches: Biological, Psychodynamic, Behaviorist, and Cognitive. Methods: Experimental, Observation and Case study; Fields of application.	3
2.	Basic Concepts	Person, Consciousness, Behavior and Experience, Perception and learning	5
3.	Memory	Process of Memory: Encoding, Storage, Retrieval; Stages of Memory: Sensory, Short term and Long term	3
4.	Motivation	Motives: Intrinsic and Extrinsic Frame Work, Theories of Motivation; Techniques of Assessment of Motivations; Frustration and Conflict.	3
5.	Emotions	Concept, Development, Expression, Theories of Emotions.	2
6.	Intelligence	Nature, Theories, Measurement and Approaches - Genetic and Environmental	3
7.	Personality	Nature, Approaches, Determinants and Theories; Techniques of Assessment: Psychometric and Projective Techniques.	5

8.	Psychology of Adjustment	Psychological Disorders: Anxiety, Stress, Depression; Psychotherapies.	4
Total:			28
Evaluation Criteria			
Components	Maximum Marks		
T1	20		
T2	20		
End Semester Examination	35		
TA	25 (Assignment, Quiz, Oral Questions)		
Total	100		

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	R.A. Baron and G. Misra, Psychology, 5th Ed., Pearson, 2015
2.	S. Nolen-Hoeksema, B. L. Fredrickson, G. R. Loftus, and C. Luts, Introduction to Psychology, 16th Ed., Cengage Learning, 2014.
3.	S. K. Ciccarelli and G. E. Meyer, Psychology, Pearson, 5 th Ed., 2017.

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B1NHS433	Semester EVEN (specify Odd/Even)	Semester IV Session 2019 -2020 Month Jan- June
Course Name	INTRODUCTION TO SOCIOLOGY		
Credits	3(2-1-0)	Contact Hours	3

Faculty (Names)	Coordinator(s)	Ms.Shikha
	Teacher(s) (Alphabetically)	Ms.Shikha

COURSE OUTCOMES		COGNITIVE LEVELS
C206-7.1	Demonstrate an understanding of sociological perspectives and concepts.	Remembering (C1)
C206-7.2	Explain the concept of social stratification and types of stratification as class, caste and gender.	Understanding (C2)
C206-7.3	Apply the major sociological perspectives, social concepts and methods in the systematic study of society	Applying(C3)
C206-7.4	Analyze the relevance of various social Institutions in societies and how it shapes and influences social interactions.	Analyzing (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Introduction to sociology as a discipline of social science, difference between common sense and sociology, Major sociological perspective and methods, the sociological imagination	5
2.	Basic Concepts of Sociology	Groups, sub-groups, society, characteristics of society, culture, institutions, Institutionalization, Conformity, Social Change	6
3.	Social stratification	Stratification-concept, theories and type. Basis of stratification caste, class, gender and race, status and Roles	5
4.	Sociology of Institutions	Kinship, Family ,Religion, Education &Economy in Society	6
5.	Process of Change and Mobility	Process of Social Change in Indian Society: Sanskritization, Westernization, Modernization, Urbanization	4
6.	Sociology of Collectivity	Collective Action and Social Movements	2
Total number of Lectures			28

Evaluation Criteria	
Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Project and Presentation)
Total	100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1	Johnson, Harry M. <i>Sociology: a systematic introduction</i> . Routledge, 2013.
2	Rawat, H. K. <i>Sociology: basic concepts</i> . Rawat Publications, 2007.
3	Macionis, John J. <i>Society: the basics</i> . Pearson/Prentice Hall, 2009.
4	C. Wright. And Mills, <i>The Sociological Imagination</i> , Oxford: Oxford University Press, 1959.
5	Peter L Berger, <i>The Social Construction of Reality: a Treatise in the Sociology of Knowledge</i> . Garden City, New York: Anchor, 1966.
6	Conley and Dalton, <i>You May Ask Yourself: An Introduction to Thinking Like a Sociologist</i> , 2nd Ed, W. W. Norton & Company New York, 2011. ISBN: 0393935175 or 978-0393935172
7	Ballentine and Roberts, <i>Our Social World: Introduction to Sociology</i> , 4th Edition, Sage. 2013.
8	Robert Parkin and Linda Stone, (ed.). <i>Kinship and Family: An Anthropological Reader</i> , U.S.A.: Blackwell, 2000, selected chapters

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B1NHS434	Semester: Even	Semester IV Session 2019 -2020 Month from Jan 2020 to June 2020
Course Name	Principles of Management		
Credits	3	Contact Hours	2-1-0

Faculty (Names)	Coordinator(s)	Dr. Shirin Alavi
	Teacher(s) (Alphabetically)	Dr. Shirin Alavi

COURSE OUTCOMES		COGNITIVE LEVELS
C303-1.1	Describe the functions, roles and skills of managers and illustrate how the manager's job is evolving.	Understanding Level (C2)
C303-1.2	Examine the relevance of the political, legal, ethical, economic and cultural environments in global business.	Analyzing Level (C4)
C303-1.3	Evaluate approaches to goal setting, planning and organizing in a variety of circumstances.	Evaluating Level (C5)
C303-1.4	Evaluate contemporary approaches for staffing and leading in an organization.	Evaluating Level (C5)
C303-1.5	Analyze contemporary issues in controlling for measuring organizational performance.	Analyzing Level (C4)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to Managers and Management	Management an Overview: Introduction, Definition of Management, Role of Management, Functions of Managers, Levels of Management, Management Skills and Organizational Hierarchy, Social and Ethical Responsibilities of Management: Arguments for and against Social Responsibilities of Business, Social Stakeholders, Measuring Social Responsiveness and Managerial Ethics, Omnipotent and Symbolic View, Characteristics and importance of organizational culture, Relevance of political, legal, economic and Cultural environments to global business, Structures and techniques organizations use as they go international .	7
2.	Planning	Nature & Purpose, Steps involved in Planning, Objectives, Setting Objectives, Process of Managing by Objectives, Strategies, Policies & Planning Premises, Competitor Intelligence, Benchmarking, Forecasting, Decision-Making.	5
3.	Organizing	Nature and Purpose, Formal and Informal Organization, Organization Chart, Structure and Process, Departmentalization by difference strategies, Line and Staff authority- Benefits and Limitations-De-Centralization and Delegation of Authority Versus, Staffing, Managerial Effectiveness.	7
4.	Directing	Scope, Human Factors, Creativity and Innovation, Harmonizing Objectives, Leadership, Types of Leadership Motivation, Hierarchy of Needs, Motivation theories,	4

		Motivational Techniques, Job Enrichment, Communication, Process of Communication, Barriers and Breakdown, Effective Communication, Electronic media in Communication.	
5.	Controlling	System and process of Controlling, Requirements for effective control, The Budget as Control Technique, Information Technology in Controlling, Productivity, Problems and Management, Control of Overall Performance, Direct and Preventive Control, Reporting, The Global Environment, Globalization and Liberalization, International Management and Global theory of Management.	5
Total number of Lectures			28

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Project, Class Test, Attendance)
Total	100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Koontz H, Weihrich H. Essentials of management: an international, innovation, and leadership perspective. McGraw-Hill Education; 10 th Edition 2018.
2.	Tripathi PC. Principles of management. Tata McGraw-Hill Education; 6 th Edition 2017.
3.	Principles of Management Text and Cases, Pravin Durai , Pearson ,2015
4.	Robbins, S.P. & Decenzo, David A. Fundamentals of Management,7 th ed., Pearson, 2010
5.	Robbins, S.P. & Coulter, Mary Management; 14 ed.,Pearson , 2009

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B1NHS435	Semester Even (specify Odd/Even)	Semester IV Session 2019 - 2020 Month from Jan-June 2020
Course Name	Financial Accounting		
Credits	3	Contact Hours	3 (2,1,0)

Faculty (Names)	Coordinator(s)	Dr. Mukta Mani (Sec-62), Dr. Sakshi Varshney (Sec-128)
	Teacher(s) (Alphabetically)	Dr. Mukta Mani, Dr. Sakshi Varshney

COURSE OUTCOMES		COGNITIVE LEVELS
C206-8.1	Understand the basic concepts of Accounting.	Understanding level (C2)
C206-8.2	Apply accounting concepts for recording of business transactions.	Applying level (C3)
C206-8.3	Compare and reconcile the accounting records with other sources of information	Analyzing level (C4)
C206-8.4	Evaluate the accounting records to identify and rectify the errors made during accounting process.	Evaluating level (C5)
C206-8.5	Construct the final accounts of a business	Creating (C6)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction to Accounting	Meaning of Accounting, Objectives of Accounting, Understanding Company Management, Stakeholders versus Shareholders, Financial Reporting Standards, Financial Reporting	3
2.	Understanding Accounting Elements	Elements of Financial Statements- Assets, Current assets, Liabilities, Current liabilities, Equity, Income, Expenses, Accounting Equation	4
3.	Accounting Concepts	Business entity concept, Money measurement concept, Going concern, Consistency, Matching concept, Cost concept, Dual aspect concept, Materiality, Full disclosure Generally Accepted Accounting Principles (GAAP)	4
4.	Journal Transactions	Journal, Rules of Debit and Credit, Compound Journal entry, Opening entry	5
5.	Ledger Posting and Trial Balance	Ledger, Posting, relationship between Journal and Ledger, Rules regarding Posting, Trial balance	5
6.	Rectification of Errors	Different types of errors, their effect on trial balance, rectification and preparation of suspense account	3

7.	Bank Reconciliation Statement	Meaning of Bank Reconciliation Statement, technique of preparing BRS, Causes of difference	2
8.	Final Accounts	Trading account, Profit and Loss account, Balance sheet, Adjustment entries	2
Total number of Lectures			28

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz + Class test +Class Participation)
Total	100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Text Books: Maheshwari S. N., Financial and Management Accounting, 5th Ed., S. Chand & Sons Publication, 2014. ISBN No.: 978-81-8054-529-0
2.	Reference Book: Ghosh, T.P., Financial Accounting for Managers, 4th Ed., Taxmann Publications, 2009

Detailed Syllabus
Lecture-wise Breakup

Subject Code	15B11HS111	Semester: EVEN	Semester IV Session 2019-2020 Month from Jan to June
Subject Name	LIFE SKILLS		
Credits	2(1-1-0)	Contact Hours	2
Faculty (Names)	Coordinator(s)	Dr. Santosh Dev and Dr. Praveen Sharma	
	Teacher(s) (Alphabetically)	Dr. Akarsh Aroro, Dr. Amandeep, Dr. Kanupriya, Dr. Praveen Sharma, Ms. Puneet Pannu, Dr. Santosh Dev	

COURSE OUTCOMES: The students will be able to:		COGNITIVE LEVELS
C209.1	Understand Life Skill required to manage self and one's environment	Understand (C2)
C209.2	Apply comprehensive set of skills for life success for self and others	Apply (C3)
C209.3	Analyze group dynamics for its effective functioning	Analysing (C4)
C209.4	Evaluate the role of women leadership and gender issues	Evaluate (C5)

Module No.	Subtitle of the Module	Topics in the module	No. of Lectures for the module
1.	Introduction	Introduction to Life Skills; basic Concepts and Relevance for Engineers	1
2.	Individual-I	Emotional Intelligence, Stress Management, Goal Setting	4
3.	Individual-II	Personality, Values and Attitudes, Assertiveness, Well being,	3
4.	Group Dynamics	Group, Group types, Group Relationship, Social Loafing, Social Facilitation	3
5.	Women Leadership	Gender Sensitization, Women Leadership.	3
Total number of Hours			14

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35

TA
Total

25 (Assignment, Presentatons and class participation)
100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Stephen P. Robbins, Organizational Behaviour, 9 th Edition, Prentice-Hall India 2001
2.	Smith, E., Hoeksema, S., Fredrickson, B., & Loftus, G. Introduction to Psychology. Thompsons and Wadsworth Co, 2003
3.	Daniel Goleman, Working With Emotional Intelligence, Bantom Books 1998
4.	Sue Bishop, Assertiveness Skills Training, Viva Books, New Delhi, 2004
5.	Adele B. Lynn 50 Activities for Developing Emotional Intelligence, Ane Books, 2003
6.	Sivasailam Thiagarajan, Glenn M. Parker; Teamwork and Teamplay, Games and Activities for Building and Training Teams., Jossey-Bass, 1999
7.	Kaul A.& Singh M., " <i>New Paradigms for Gender Inclusivity</i> ", PHI Pvt Ltd (2012)

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17EC473	Semester Even	Semester IV Session 2019 -2020 Month from Jan – Jun
Course Name	Digital Signal Processing (DSP) Laboratory		
Credits	1	Contact Hours	0-0-2

Faculty (Names)	Coordinator(s)	Hemant Kumar, Neetu Singh
	Teacher(s) (Alphabetically)	Abhinav Gupta, Hemant Kumar, Kuldeep Baderia, Neetu Singh, Vimal Kumar Mishra, Vineet Khandelwal, Vivek Dwivedi, Yogesh Kumar

COURSE OUTCOMES		COGNITIVE LEVELS
C277.1	Recall and interpret discrete time signals and systems in time domain and in frequency domain	Understanding Level (C2)
C277.2	Develop and demonstrate coding skills from basic mathematical operations to complex operations like DFT and FFT.	Applying Level (C3)
C277.3	Identify and examine different digital filter structures.	Analyzing Level (C4)
C277.4	Determine and observe magnitude and phase characteristics (Frequency response Characteristics) of digital IIR-Butterworth, Chebyshev filters and digital FIR filters using window techniques for various applications of DSP.	Evaluating Level (C5)

Module No.	Title of the Module	List of Experiments	CO
1.	Introduction to MATLAB	Introduction to the MATLAB and its features.	C277.1
2.	Introduction to applications of MATLAB	Introduction to the different applications of MATLAB.	C277.1
3.	Discrete-Time Signals	Generation of discrete time signals with different operation on independent and dependent variable.	C277.1
4.	LTI Systems	Write your own MATLAB function to implement linear convolution as an operation to analyze discrete time LTI system.	C277.1
5.	Z-transform	Compute z- transform and inverse z-transform of a discrete time signals and systems. Plot pole-zero map of the same using symbolic tool box.	C277.1
6.	Discrete Fourier Transform (DFT)	Write your own MATLAB function to compute DFT (Discrete Fourier Transform) and IDFT (Inverse Discrete Fourier Transform) for the spectral analysis of signals.	C277.2
7.	Spectral Analysis	To determine magnitude and power spectrum of given signal.	C277.2
8.	Circular Convolution	Write your own MATLAB function 'mycirconv' to compute circular convolution of two sequences.	C277.2

9.	FFT	Develop radix-2 butterfly FFT (Decimation in Time) algorithm for the computation of N-point dft.	C277.2
10.	FIR Filter	Write MATLAB program to design digital FIR filter employing windowing technique.	C277.4
11.	IIR Filter	Write MATLAB program to design IIR digital filter for a given specification using bilinear transformation and impulse invariant method.	C277.4
12.	IIR Structures	Write MATLAB program for realization of digital IIR filter using direct form-I & II, cascade and parallel method.	C277.3
13.	DFT Properties	Virtual Lab: Study of Transform domain properties and its use.	C277.2
14.	FIR Filter Study	Virtual Lab: Study of FIR filter design using window method.	C277.4
15.	IIR Filter Study	Virtual Lab: Study of Infinite Impulse Response (IIR) filter.	C277.4

Evaluation Criteria

Components	Maximum Marks
V1	20
V2	20
AC	25
Attendance	15
Report	15
Virtual Lab Exp	5
Total	100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	Sanjit K. Mitra, Digital Signal Processing: With DSP Laboratory Using MATLAB: A Computer-Based Approach, 4 th Edition, TMH, 2013.
2.	Vinay K. Ingle, John G. Proakis, Digital Signal Processing Using MATLAB, 3rd Edition, Cengage Learning, 2012.

Detailed Syllabus
Lecture-wise Breakup

Course Code	16B1NHS332	Semester : Even (specify Odd/Even)	Semester : IV Session 2019 -2020 Month from: July-December
Course Name	Quantitative Methods for Social Sciences		
Credits	03	Contact Hours	2-1-0

Faculty (Names)	Coordinator(s)	Manas Ranjan Behera
	Teacher(s) (Alphabetically)	Manas Ranjan Behera

COURSE OUTCOMES		COGNITIVE LEVELS
After pursuing the above mentioned course, the students will be able to:		
C206-3.1	<i>Demonstrate</i> the key concepts of different quantitative methods used in social sciences.	Understanding Level- (C2)
C206-3.2	<i>Classify and summarize</i> the data to be used for analysis.	Understanding Level- (C2)
C206-3.3	<i>Apply</i> the theoretical concept to perform basic data analysis in social sciences.	Apply Level –(C3)
C206-3.4	<i>Examine</i> different statistical methods and be able to discuss the merits and limitations of a particular method	Analyze Level –(C4)
C206-3.5	<i>Recommend</i> appropriate conclusions following empirical analysis	Evaluation Level- (C5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Introduction to Quantitative Methods, Classification & Presentation of Data: Tabulation-Types of Table, Diagrammatical and Graphical presentation.	3
2.	Mathematical	Mathematical basis of Managerial Decision-Concepts,	3

	Concepts	Frequency Distribution and their Analysis	
3.	Statistical Concepts	Measures of Central Tendency, Measures of Dispersion, Measures of Association, Sampling and sample size estimation, Point estimation, Statistical Intervals based on Single sample.	4
4.	Hypothesis Testing	Hypothesis Testing based on single sample, Inferences based on Two samples, t, Z and chi- square and F tests	8
5.	Regression Analysis	Simple Linear Regression and Correlation, Multiple Regression Model	3
6.	Time Series Analysis	Trend Projection, Moving averages and Exponential smoothing Techniques, Index Numbers	3
7.	Multivariate Analysis	ANOVA, MANOVA, Factor Analysis, Discriminant Analysis	4
Total number of Lectures			28

Evaluation Criteria	
Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz+ Assignment+Viva-voce)
Total	100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	Sirkin, RM. Statistics for the Social sciences. 3rd ed. Thousand Oaks, Calif: Sage Publications; 2006.
2.	Montgomery, DC. , George C. Runger. Applied statistics and probability for engineers. 3rd ed. Hoboken, NJ: Wiley.,2007
3.	Healey, JF. Statistics: A Tool for Social Research. 9th ed. Calif: Wadsworth Cengage Learning; 2012.

Detailed Syllabus
Lecture-wise Breakup

Course Code	16B1NHS431	Semester Even (specify Odd/Even)	Semester IV Session 2019-20 Month from Jan-June
Course Name	HUMAN RESOURCE MANAGEMENT		
Credits	3(LTP: 2-1-0)	Contact Hours	3

Faculty (Names)	Coordinator(s)	Dr. Praveen Kumar Sharma
	Teacher(s) (Alphabetically)	Dr. Praveen Kumar Sharma

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Demonstrate a basic understanding of different functions of human resource management: Employer Selection, Training and Learning, Performance Appraisal and Remuneration, Human Relations and Industrial Relations.	Understand Level (C2)
CO2	Apply various tools and techniques in making sound human resource decisions.	Apply level (C3)
CO3	Analyze the key issues related to administering the human resource management activities such as recruitment, selection, training, development, performance appraisal, compensation and industrial relation.	Analyze Level (C4)
CO4	Critically assess and evaluate different human resource & industrial relation practices and techniques and recommend solutions to be followed by the organization	Evaluate Level (C5)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Introduction to Human Resource Management and its definition, HRM functions and its relation to other managerial functions, Nature, Scope and Importance of Human Resource Management in Industry, Role & position of Personnel function in the organization. Human Resource Planning	3
2.	Employer Selection	Recruitment Process; Selection Process - Job and Worker Analyses, Matching Job with the Person; Selection Methods - Application Blank, Biographical Inventories, References and Recommendation Letters, Interviews	8
3.	Training and Learning	Need Identification; Psychological Factors in Learning; Training Methods in the Workplace; Effective Training Programme	6
4.	Performance Appraisal and Remuneration	Different methods of Performance Appraisal, Basic concepts in wage administration, company's wage policy, Job Evaluation, Issues in wage administration, Bonus & Incentives	6

5.	Human Relations and Industrial Relations, Trends in Human Resource Management	Factors influencing industrial relations - State Interventions and Legal Framework - Role of Trade unions - Collective Bargaining - Workers' participation in management. Trends in Human Resource Management: Analytics, Artificial Intelligence	5
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Total number of Lectures			28
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Evaluation Criteria	
Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25(Project, Quiz)
Total	100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	VSP Rao, Human Resource Management: Text and Cases, Excel Books, 2002, 2nd Edition
2.	K. Aswathappa, Human Resource Management: Text and Cases, 8th Edition, Published by Mc Graw-Hill
3.	Dessler, Gary and Varkkey, Biju., Human Resource Management, 14th Edition published by Pearson Education Ltd. 2017

Detailed Syllabus Lecture-wise Breakup

Subject Code	18B11EC215	Semester Even	Semester IV Session 2019-20 Month from January to June
Subject Name	Digital Circuit Design		
Credits	4	Contact Hours	3-1-0
Faculty Members	Coordinator(s)	Jitendra Mohan, Richa Gupta	
	Teacher(s)	Akansha Bansal, Bhartendu Chaturvedi, Jasmine Saini, Saurabh Chaturvedi	

At the end of the course, students will be able to:

S. No.	Course Outcomes	Cognitive Levels/ Blooms Taxonomy
C212.1	Understand the representation and conversion of various number systems and binary codes.	Applying Level (C3)
C212.2	Understand the fundamental concepts and techniques used in digital electronics which in turn form a digital logic.	Applying Level (C3)
C212.3	Analyze and construct combinational and sequential logic circuits. Develop skill to troubleshoot digital circuits using Finite state machines. Study and Implement combinational and sequential circuits using VHDL.	Analyzing Level (C4)
C212.4	Classify different semiconductor memories and analyze digital system design using PLDs. Classify and analyze wave shaping circuits and digital logic families.	Analyzing Level (C4)

Module No.	Subtitle of the Module	Topics in the Module	No. of Lectures
1	Introduction to Digital Systems, Binary Codes and Boolean Algebra	Digital systems, Importance, Analog vs. digital world; Conversion of bases, Representation of negative numbers, 9's and 1's complements, 10's and 2's complements, Arithmetic using 1's and 2's complements; Hexadecimal code, BCD, Excess-3 code, Gray code and Alphanumeric code; Basic theorems and properties of Boolean algebra; Digital logic gates.	4
2	Boolean Function Representation and Minimization Techniques	Canonical and standard forms; Prime implicants and essential prime implicants; Minimization of Boolean functions using Karnaugh map and Quine-McCluskey technique; Two-level gate implementation.	5
3	Combinational logic circuits	Binary adders and subtractors: Half adder, full adder, half subtractor, full subtractor, full adder using half adder, parallel adder, adder cum subtractor, look ahead carry adder; Circuit delay calculation; Magnitude comparator; Decoder and encoder; Multiplexer and demultiplexer; Binary multiplier; Code converters .	9

4	Sequential logic circuits	Latches and flip-flops: SR, JK, master-slave JK, T and D; Conversion of flip-flops; Synchronous and asynchronous counters; Registers and shift registers; Counters using shift registers; State diagram; Analysis of sequential circuits using flip-flops.	10
5	State machines	Finite state machine of sequential circuits - Moore and Mealy machines.	3
6	Programmable logic devices	RAMs- DRAM, SRAM and ROM. PLDs: PLAs, PALs and PROMs.	3
7	Wave shaping circuits	Linear wave shaping circuits, Schmitt trigger, Square wave generator, IC-555 based multivibrators.	2
8	Introduction to digital logic families	Parameters of logic families, Types- DTL, RTL, TTL, CMOS.	3
9	Introduction to VHDL	Basic language elements, Different modeling styles: Dataflow, structural and behavioral.	3
Total Lectures			42

Evaluation Criteria

Components	Maximum Marks
T1	20
T2	20
End Semester Examination	35
TA	25
Total	100

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	M. Morris Mano, <i>Digital logic and computer design</i> , 5th ed., Pearson Prentice Hall, 2013.
2.	M. Morris Mano and Michael D. Ciletti, "Digital Design with an Introduction to the Verilog Hdl," 5 th Edition, Pearson Education, 2013.
3.	J. Bhasker, <i>A VHDL Primer</i> , 3rd ed., Pearson Education, 2015.
4.	R. P. Jain, "Modern Digital Electronics," 4 th Edition, Tata McGraw-Hill Education, 2009.
5.	A. Anand Kumar, "Fundamentals of Digital Circuits," PHI; 4th Revised edition, 2016.

Detailed Syllabus
Lab-wise Breakup

Course Code	18B15EC215	Semester: Even (specify Odd/Even)	Semester: 4 th Session 2019-20 Month from: January to June
Course Name	Digital Circuit Design Lab		
Credits	1	Contact Hours	2

Faculty (Names)	Coordinator(s)	Dr. Bhartendu Chaturvedi, Dr. Shamim Akhter
	Teacher(s) (Alphabetically)	Dr. Akansha Bansal, Dr. Atul Kumar, Dr. Jasmine Saini Dr. Jitendra Mohan, Dr. Kapil Dev Tyagi, Dr. Megha Agarwal, Dr. Parul Arora, Dr. Richa Gupta, Dr. Satyendra Kumar, Dr. Saurabh Chaturvedi, Dr. Vikram Karwal

COURSE OUTCOMES - At the end of the course, students will be able to:		COGNITIVE LEVELS
C271.1	Learn the nomenclature of digital ICs, familiarize and verify the truth tables of logic gates using ICs.	Applying Level (C3)
C271.2	Analyze, construct and verify various combinational circuits and their functionalities.	Analyzing Level (C4)
C271.3	Identify basic requirements to analyze, construct and verify sequential circuits.	Analyzing Level (C4)
C271.4	Utilize VHDL to implement and simulate the combinational and sequential logic circuits.	Applying Level (C3)

Module No.	Title of the Module	List of Experiments	CO
1.	Nomenclature and specifications of digital ICs	Introduction to Digital Circuit Design Lab: Nomenclature of Digital ICs, specifications, study of the data sheet, concept of V_{CC} and ground, verification of the truth tables of logic gates using ICs.	C271.1
2.	Implementation of basic logic gates	(a) To implement basic logic gates AND, OR, NOT using NAND and NOR gates (b) To implement Ex-OR gate using NOR gates only (c) To implement the Boolean expression(s) using NAND gates	C271.1
3.	Combinational Logic circuits	To design 4-bit Binary to Gray and Gray to Binary Code Converters.	C271.2
4.	Combinational Logic circuits	To realize a Half Adder, Full Adder and Half Subtractor using logic gates.	C271.2
5.	Combinational Logic circuits	To design a 2-bit Multiplier using basic logic gates.	C271.2
6.	Combinational Logic circuits	To realize and implement 2-bit Magnitude Comparator using logic gates.	C271.2
7.	Combinational Logic circuits	To realize 4:1 Multiplexer using NAND gates.	C271.2
8.	Combinational Logic circuits	To realize 2:4 Decoder using basic logic gates and to realize Half Adder using 2:4 Decoder as a block.	C271.2
9.	Seven-segment display	Display decimal digit between 0-9 on seven segment using BCD Decoder IC-7447.	C271.2
10.	Sequential Logic	To realize and verify the truth table of SR, Gated SR, Gated D	C271.3

	circuits	Latch using logic gates and of JK flip flop using IC-74LS76.	
11.*	Sequential Logic circuits	To design a Ripple Counter (Asynchronous) using JK flip flop IC-74LS76 and display the output on seven segment.	C271.3
12.*	Sequential Logic circuits	Design and implement counting sequence 0, 7, 1, 6, 2, 5, 0, 7.... (Repeating) using IC-74LS76.	C271.3
13.*	Wave shaping circuits	Using IC-555 in Astable mode to generate a rectangular pulse of 1ms period with duty cycle 75%.	C271.3
14.*	Combinational and Sequential Logic Circuits using VHDL	(a) Write the VHDL program for the following logic circuits: Half Adder, Full Adder, 2X1 Multiplexers, 2:4 Decoder. (b) Write VHDL program for D, JK, T and RS flip flops.	C271.4

Evaluation Criteria

Components	Maximum Marks
Mid Sem Viva	20
End Sem Viva	20
Day-to-day performance	30
Attendance	15
Lab Record	15
Total	100

* These are advanced level experiments.

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)	
1.	M. Morris Mano, Digital logic and computer design, 5th ed., Pearson Prentice Hall, 2013.
2.	M. Morris Mano and Michael D. Ciletti, "Digital Design with an Introduction to the Verilog Hdl," 5 th Edition, Pearson Education, 2013.
3.	J. Bhasker, A VHDL Primer, 3rd ed., Pearson Education, 2015.
4.	R. P. Jain, "Modern Digital Electronics," 4 th Edition, Tata McGraw-Hill Education, 2009.
5.	A. Anand Kumar, "Fundamentals of Digital Circuits," PHI; 4th Revised edition, 2016.

Detailed Syllabi Lecture-wise Breakup

Subject Code	18B11EC212	Semester	Semester 4 th Session <u>2020-21</u>
		EVEN	Month from <u>Jan</u> to <u>June</u>
Subject Name	ANALOG AND DIGITAL COMMUNICATION		
Credits	4	Contact Hours	3-1-0

Faculty (Names)	Coordinator(s)	Ashish Goel, Vimal Kimar Mishra
	Teacher(s) (Alphabetically)	Rahul Kaushik, Reema Budhiraja, Yogesh Kumar

COURSE OUTCOMES		COGNITIVE LEVELS
C211.1	Understand need of modulation and differentiate among various amplitude modulation schemes and design simple systems for generating and demodulating amplitude modulated signals.	Applying Level (C3)
C211.2	Analyze the generation and detection of FM signal and design basic systems for the indirect and direct generation of FM signals.	Analyzing Level (C4)
C211.3	Understand the concepts of transmitters and receivers for analog modulations, Sampling process, time division multiplexing and GSOP.	Understanding Level (C2)
C211.4	Understand the concepts of waveform coding techniques, Line coding schemes and analysis of ISI Mitigation Techniques	Analyzing Level (C4)
C211.5	Understand the concepts of digital modulation techniques and evaluate their probability of error and bandwidth efficiency.	Evaluating Level (C5)

Module No.	Subtitle of the Module	Topics	No. of Lectures
1.	Introduction	Elements of a communication system; Analog and digital signals, bandlimited signals and systems, bandwidth	2
2.	Amplitude modulation	Introduction to modulation; AMSC, DSB, SSB, VSB Communication. Detection of AM signals: Coherent detection, Envelope detection, Costas receiver.	7
3.	Angle modulation	Concepts of FM and PM, Narrowband and wideband FM, Direct and indirect methods of FM generation, Detection of FM signals	6
4.	Transmitters , Receivers and Multiplexing Techniques	AM and FM Transmitters, Superheterodyne AM and FM Receivers. FDM,TDM, Interchannel crosstalk and bandwidth effects	3
5.	Sampling and Quantization techniques	Time and frequency domain sampling with aperture effects, Reconstruction of signals, Quantization process and mean square quantization error, GSOP.	5

6.	Speech Coding ,Line Coding and Baseband Digital Transmission	Pulse Code modulation, Line Codes: Unipolar-NRZ, polar-NRZ, Unipolar-RZ, Bipolar-RZ, Manchester Code, DPCM, DM, Bit rate and bandwidth of digital signals, ISI Mitigation Techniques	11
7.	Digital Modulation Techniques	ASK, FSK ,PSK, QPSK Modulation, 16-QAM, Demodulation, Constellation diagrams, BER and their BW calculation,	9
Total number of Lectures			43

Recommended Reading (Books/Journals/Reports/Websites etc.: Author(s), Title, Edition, Publisher, Year of Publication etc. in IEEE format)	
1.	Lathi B.P, Modern Digital and Analog Communication Systems, 5 th /ed ,Oxford University Press, 2018
2.	H. Taub, D. L. Schilling and Gautam Saha, Principles of Communication Systems, 4 th /ed, TMH, 2017
3.	S.Haykin, Digital Communication Systems ,John Wiley & Sons, 2013

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11EC413	Semester Even	Semester IV	Session 2019 –2020
Course Name	DIGITAL SIGNAL PROCESSING			
Credits	4	Contact Hours	4	

Faculty (Names)	Coordinator(s)	Kuldeep Baderia, Vineet Khandelwal
	Teacher(s) (Alphabetically)	Hemant Kumar, Neetu Singh, Smriti Bhatnagar

COURSE OUTCOMES		COGNITIVE LEVELS
C215.1	Recall the principles of z-transforms, explain the DFTs (Discrete Fourier Transform) and develop FFT (Fast Fourier Transform) algorithms for DFT.	Applying (C3)
C215.2	Construct and Analyze the digital FIR (Finite Impulse Response) and IIR (Infinite Impulse Response) filters.	Analyzing (C4)
C215.3	Demonstrate multi-rate signal processing and relate DSP (Digital Signal Processing) in various applications.	Understanding (C2)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Review of Discrete time Signals and Systems	Review of discrete-time sequences and systems, discrete time system analysis using Z transform.	3
2.	Discrete Fourier Transform and FFT	Discrete Fourier Transform (DFT) and its properties, Linear filtering methods based on DFT, Frequency analysis of signals using the DFT, Fast Fourier Transform (FFT) algorithms using decimation in time and decimation in frequency techniques.	11
3.	FIR Filter design	Basic structures of digital filters; Significance of Linear phase response, FIR filters design - Frequency sampling and Windowing techniques, Computer aided design.	8
4.	IIR Filter design	Approximation of filter functions: Butterworth, Chebyshev, Elliptic; IIR filter design based on analog filter functions- Impulse Invariant and modified invariant response techniques, Bilinear transformation method.	10
5.	Multi-rate Digital Signal Processing	Decimation & Interpolation, Filter design with sampling rate conversion by a rational factor I/D	5
6.	DSP Applications	Applications in speech and image processing, and power	7

		spectrum estimation.	
Total number of Lectures			44
Evaluation Criteria			
Components		Maximum Marks	
T1		20	
T2		20	
End Semester Examination		35	
TA		25	
Total		100	

Recommended Reading material: Author(s), Title, Edition, Publisher, Year of Publication etc. (Text books, Reference Books, Journals, Reports, Websites etc. in the IEEE format)

1.	L. Tan and Jean Jiang , Digital Signal Processing Fundamentals and Applications, Third Edition, Academic Press, 2013
2.	J. G. Proakis & D. G. Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, Fourth edition, PHI, 2007.
3.	S. K. Mitra, Digital Signal Processing: A Computer Based Approach, Fourth Edition, McGraw Hill, 2013.
4.	L. R. Rabiner, B. Gold, Theory and application of digital signal processing, Third Edition, PHI, 2012
5.	A. Antoniou, Digital Signal Processing: Signals, Systems, and Filters, TMH, 2006