Detailed Syllabus
Lecture-wise Breakup

Course Code	**15B1NHS431**	**Semester: EVEN**	**Semester:** IV **Session:** 2021-2022 **Month from** Feb to Jun
Course Name	Introduction to Literature		
Credits	3	**Contact Hours**	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.	Understand Level (C2)
C206-5.2	Develop a critical appreciation of life and society through a close reading of select texts.	Apply Level (C3)
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.	Analyze Level (C4)
C206-5.4	To interpret Literature as reflection of cultural and moral values of life and society.	Evaluate Level (C5)

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, Project and class description)
Total	**100**

Project Based Learning: The students take up a project in a group of 4-5. The Project consists of 2 components: A Digital Poster & a Report. The students pick a text (Novel /Play) of their choice which has not been covered in the syllabus. The analysis of the text is to be submitted in the form of a Narrative Digital Poster. The analysis should include: Introduction, Objectives/Research Questions, Background Study / literature review, Method/ Discussion(Themes, Narrative Structure, Plot in the context of Conflicts, Freitag's model and any 3 Major Literary Devices used by the writer and application of Psychoanalysis) & Analysis. The students should identify the themes in context of the following: a)Different spectrum of life as explored in the text b) Human behavior as exhibited in the text c) Cultural aspects as portrayed in the text d) Moral consciousness of an individual and the society as analysed in the text. The project includes a brief 2-3 pages report which should highlight the following: a) The Names of the team members along with individual contribution in the whole. b) The channels undertaken for team coordination and for remote collaboration.c) Challenges faced and Lessons learnt in virtual coordination/communication. d) Rationale for choosing the particular text. e) Abstract of the entire poster in 250 words, highlighting introduction, objectives, methodology adopted, discussion, analysis and conclusion. f) Learning of the team from the poster based project work done. g) Relevance of the findings/ study for the society and future h) Limitations of the study done.

Recommended Reading material:

1	John E. Eck, '*Writing with Sweet Clarity'* 1st Edition. Routledge. 2022 https://doi.org/10.4324/9781003167532
2	M.H. Abrams, Geoffrey Harpham *'A Glossary of Literary Terms'*, 11th Edition, Cengage Learning, 2014,
3	Mark William Roche, *'Why Literature matters in the 21st Century'*, 1st Edition, Yale University Press, 2004.
4	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
5	Khalid Hasan (Translator), *'Saadat Hasan Maanto : Toba Tek Singh'* Reprint, Penguin Books, India, 2008.
6	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
7	Anon, (a.n.d.). *The Spectator Club. Sir Richard Steele*. 1909-14. Available at: https://www.bartleby.com/27/7.html
8	*All poems online: http://www.poetryfoundation .org*
9	Wolfgang Clemen, '*Shakespeare's Soliloquies'*, First Edition, Routledge, London, 1987.

Detailed syllabus
Lecture-wise Breakup

Subject Code	**15B1NHS432**	**Semester: Even**	**Semester:** IV **Session:** 2021-2022 **Months: from** Feb to Jun
Subject Name	Introduction to Psychology		
Credits	3	**Contact Hours**	2-1-0
Faculty (Names)	**Coordinator(s)**	Dr. Badri Bajaj, Dr. Amba Agarwal	
	Teacher(s) (Alphabetically)	Dr. Amba Agarwal, Dr. Badri Bajaj	

COURSE OUTCOMES		**COGNITIVE LEVELS**
C206-6.1	Demonstrate a basic understanding of different perspectives and concepts of psychology	Understand Level (Level 2)
C206-6.2	Apply the concepts of psychology in day to day life	Apply Level (Level 3)
C206-6.3	Examine the different theoretical perspectives and models of psychology	Analyze Level (Level 4)
C206-6.4	Develop solutions for problems related to psychology using appropriate tools/models	Create Level (Level 6)

Module No.	**Title 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:	**5**

		Psychometric and Projective Techniques.	
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 (Project, Assignment, Quiz)
Total	**100**

Project based learning: Students in a group will choose a research topic from the syllabi of psychology. Students will cover the following points to prepare project reports: Understanding of concept, related theories and perspectives; describe the relevance of the chosen concept for personal growth; discuss the application of chosen topic for their professional life; elaborate the relevance of the topic at group level and societal level. Discussions on these practical aspects will enhance students' understanding & application of concepts of psychology in day to day life.

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, 5th Ed., 2017.
4.	Clifford Morgan, Richard King, John Weisz, John Schopler, Introduction to Psychology, 7th Ed., McGraw Hill Education, 2017.
5.	S. Pandit, Introduction to Psychology, 1st Ed., SAGE Publications; 2022
6.	Gregory Feist and Erika Rosenberg, Psychology: Perspectives and Connections, 5th Ed., McGraw-Hill Education, 2021

Detailed Syllabus
Lecture-wise Breakup

Course Code	**15B1NHS433**	**Semester** EVEN	**Semester:** IV **Session:** 2021 -2022 **Month from** Feb to Jun
Course Name	Introduction to Sociology		
Credits	3	**Contact Hours**	2-1-0

Faculty (Names)	**Coordinator(s)**	Prof Alka Sharma
	Teacher(s) (Alphabetically)	Prof Alka Sharma

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

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Emergence of Sociology- forces and historical background, nature and scope, relationship with other social sciences, difference between common sense and sociology, Major sociological perspective and methods, the sociological imagination	5
2.	Basic Concepts of Sociology	Society, Culture, Groups, sub-groups, Communities, Association, Organization, social interaction and social structure: status and role	4
3.	Social stratification	Stratification-concept, theories and type. Basis of stratification caste, class, gender and race, status and Roles	4
4.	Sociology of Institutions	Kinship, Family ,Religion, Education &Economy in Society	5
5.	Process of Change and Mobility	Concept, theories and Agents of Social Change, Process of Social Change in Indian Society: Sanskritization, Westernization, Modernization, Urbanization	6
6.	Politics and Society	Power, Elite, Bureaucracy, Pressure groups, Political parties, nation, state and civil society, protest, agitation and Social Movements	4
		Total number of Lectures	**28**

Evaluation Criteria	
Components	**Maximum Marks**
T1	20
T2	20 (Project based)
End Semester Examination	35
TA	25 (Presentation, assignment, quiz and tutorial participation)
Total	**100**

Project based learning: Each student will be assigned a project based on primary data collection through in-depth interviews with their parents, grandparents and other relatives. Topic of the project- the students will conduct a multidimensional analysis of their class with the Occupation, Education, Income, and Wealth variable, using their parents, grandparents, and themselves as examples to find out how do these variables relate to Social Class and social mobility? How has the Social Class of their family changed (or not) over the past three generations?

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

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B1NHS434	**Semester:** Even	**Semester:** IV **Session:** 2021 -2022 **Month from** Feb to Jun
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.	Understand Level (C2)
C303-1.2	Examine the relevance of the political, legal, ethical, economic and cultural environments in global business.	Analyze Level (C4)
C303-1.3	Evaluate approaches to goal setting, planning and organizing in a variety of circumstances.	Evaluate Level (C5)
C303-1.4	Evaluate contemporary approaches for staffing and leading in an organization.	Evaluate Level (C5)
C303-1.5	Analyze contemporary issues in controlling for measuring organizational performance.	Analyze 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	Organizing ,Benefits and Limitations-De-Centralization and Delegation of Authority, Authority versus Power ,Mechanistic Versus Organic Organization ,Common Organizational Designs, Contemporary Organizational Designs and Contingency Factors, The Learning Organization 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 ,Human Resource Inventory, Job Analysis , Job Description, Recruitment and	7

		Selection, Selection Tools Staffing, Managerial Effectiveness, Staffing, Training, Employee Performance Management, Compensation and Benefits, Contemporary Issues in Managing Human Resources .	
4.	Directing	Scope, Human Factors, Creativity and Innovation, Harmonizing Objectives, Leadership, Types of Leadership, Directing, Managers as leaders, Early Leadership Theories…Trait Theories, Behavioral Theories, Managerial Grid, Contingency Theories of Leadership, Directing ...Path Goal Theory, contemporary views of Leadership, Cross Cultural Leadership, Leadership Training, Substitutes of Leadership	4
5.	Controlling	Controlling, Introduction to Controlling System and process of Controlling, Requirements for effective control, The planning Contol link, The process of control, types of control The Budget as Control Technique, Information Technology in Controlling, Productivity, Problems and Management, Control of Overall Performance, Direct and Preventive Control, Financial Controls , Tools for measuring organizational Performance ,Contemporary issues in control Workplace concerns, employee theft, employee violence	5
		Total number of Lectures	**28**

Evaluation Criteria

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

Project Based Learning: The project is to be done in group size of 4-5 members each. Student groups can choose an organization from one of the following themes-Staffing and Controlling in a virtual world, Staffing and controlling in the Banking Sector, Staffing and Controlling and the IT industry, Staffing and Controlling in Hospitality/Telecom/Airlines, Staffing and Controlling in Logistics, Staffing and Controlling in International Business and Staffing and Controlling in Consulting. Study the staffing and controlling processes of the chosen organization. Students were asked to submit their research analysis in the form of a project report. This adds to the management related employability skills in an organization as staffing and controlling are important aspects of overall management function.

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

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B1NHS435	**Semester**: Even	**Semester Session**:2021-22 **Month from**: Jan-June 2022
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.	Understand level (C2)
C206-8.2	Apply accounting concepts for recording of business transactions.	Apply level (C3)
C206-8.3	Compare and reconcile the accounting records with other sources of information.	Analyze level (C4)
C206-8.4	Evaluate the accounting records to identify and rectify the errors made during accounting process.	Evaluate level (C5)
C206-8.5	Construct the final accounts and cash flow statement of a business.	Create level (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	2
2.	Understanding Accounting Elements	Elements of Financial Statements- Assets, Current assets, Liabilities, Current liabilities, Equity, Income, Expenses, Accounting Equation	2
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)	2
4.	Journal Transactions	Journal, Rules of Debit and Credit, Compound Journal entry, Opening entry	2
5.	Ledger Posting and Trial Balance	Ledger, Posting, relationship between Journal and Ledger, Rules regarding Posting, Trial balance	3
6.	Rectification of Errors	Different types of errors, their effect on trial balance, rectification and preparation of suspense account	5

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	6
9.	Cash Flow Statement	Introduction of Cash Flow Statement, Classification of Cash inflows and Cash Outflows Activities, Elements of the Cash Flow Statement, Methods of Cash Flow Statement, Limitations Of Cash Flow Statement	4
		Total number of Lectures	**28**

Evaluation Criteria

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

Project Based learning: Students form a group of 4-5 students. Each group is required to choose a company listed in Indian stock exchange and download its latest annual report. Students are required to describe the company, composition of board of directors, number of company's executives, independent directors, and background of independent directors. They are required to find out financing, investing and operating activities and examine the change in total assets, sales and net profit of the company. As per auditor's report, company's position and future plans for growth of the company is also analyzed.

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.	Maheshwari, S. N., Maheshwari, S.K. Maheshwari, S.K., Financial Accounting, 6th Ed., S. Chand & Sons Publication, 2018.
2.	Narayanswamy,R., Financial Accounting: A Managerial Perspective, 6th Ed., Taxmann Publications, 20017
3.	Tulsian,P., Financial Accounting,1st Ed., Pearson Education India,2002
4.	Bhattacharya, A., Financial Accounting for Business Managers, 4th Ed., Prentice Hall of India,2012
5.	Weygandt.J., Kimmel, P., Kieso,D., Accounting Principles, 12th Edition, John Wiley & Sons,2015
6.	Barton,M., Bhutta, P.,S. O'Rourke,J.,Satyam Computer Services Ltd: Accounting fraud in India,London,SAGE Publications Ltd, 2017

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11CI313	**Semester:** Even	**Semester:** IV **Session:** 2021 -2022 **Month from** Feb to Jun
Course Name	Computer Organization and Architecture		
Credits	4	**Contact Hours**	3-1-0

Faculty (Names)	**Coordinator(s)**	Dr. Pawan Kumar Upadhayay
	Teacher(s) (Alphabetically)	Dr. Pawan Kumar Upadhayay

COURSE OUTCOMES		**COGNITIVE LEVELS**
C213.1	Summarize and compare the different computer systems based on RISC and CISC Architecture.	Analyze Level (Level 4)
C213.2	Categorize different types of computers based on Instruction set Architecture.	Analyze Level (Level 4)
C213.3	Apply the knowledge of performance metrics to find the performance of systems.	Apply Level (Level 3)
C213.4	Design RISC and CISC based Computer using Hardwired / Microprogrammed Controller.	Evaluate Level (Level 5)
C213.5	Create and analyze an assembly language program of RISC and CISC based systems.	Evaluate Level (Level 5)
C213.6	Apply the knowledge of pipeline, IO and cache to understand these systems. Further, analyze the performance of such systems.	Analyze Level (Level 4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Levels in architecture, Virtual machine, Evolution of multi-level machines.	2
2.	Performance of Computer	Performance Measures For Computer System	2
3.	CPU Organization	Data-path and control, Instruction execution, Microinstruction.	3
4.	Data Path and Control	Hardwired designing for JC62. Micro-programmed control designing for JC62.	2
5.	Generalized Study of Instruction Set Architecture	Stack/accumulator/register-register/register-memory type of architecture. Memory addressing techniques.	2
6.	Types of Instruction	Data movement, Arithmetic/logic, Control flow, Addressing modes. Instruction format.	2
7.	Instruction Set Architecture (ISA) of 8085	8085 Architecture, 8085 Instruction Set, 8085 Instruction Format, 8085 Addressing Modes, 8085 instruction execution and datapath. 8085 Assembly programming for simple applications.	5

8.	ISA of MIPS	MIPS Architecture, MIPS Instruction Set, MIPS Instruction Format, MIPS Addressing Modes, MIPS instruction execution and datapath. MIPS Assembly programming for simple applications.	5
9.	ISA of 8086	8086 Architecture, 8086 Instruction Set, 8086 Instruction Format, 8086 Addressing Modes, 8086 instruction execution and datapath. 8086 Assembly programming for simple applications.	5
10.	Memory Organization	Hierarchal memory structure, Cache memory and organization. Memory interfacing for 8085 and 8086.	5
11.	I/O Organization	Programmed/Interrupt driven I/O, Direct memory access	4
12.	Pipelining	Introduction to Pipelining System and Pipelining in RISC based Systems (MPIS)	3
13.	Multicore Architecture	Generalized study of Multicore Machines.	2
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Attendance =07, Class Test or/and Quizzes, etc = 07, Internal assessment = 05, Assignments in PBL mode = 06).
Total	**100**

Project Based Learning: Each student in a group of 3-4 will choose a real-life computer hardware application area. To make a project, the students will analyze and define the performance improvement hardware and software systems in terms of functional requirements. Each group will design architectural diagram to understand the organizational structure of the application and implement in assemble or hardware level language. Each group will build prototype of such system and demonstrate among their peer group to get review/feedback on improvement of system.

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, Computer System Architecture, Prentice Hall of India Pvt Ltd, 3rd Edition (updated), 30 June 2017.
2.	William Stallings, Computer Organization and Architecture–Designing for Performance, Ninth Edition, Pearson Education, 2013.
3.	John L. Hennessy and David A Patterson, Computer Architecture A quantitative Approach, Morgan Kaufmann / Elsevier, Sixth Edition, 23rd November 2017
4.	Ramesh Gaonkar, Microprocessor Architecture Programming and Applications with the 8085, Prentice Hall, Eight Edition, 2013.
5.	Barry B. Brey, The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit Extensions: Architecture, Programming, and Interfacing. Pearson Education India, Eigth Edition, 2019.
6.	Nicholas Carter, Schaum's outline of Computer Architecture, Tata McGraw Hill, Second Edition, 2014.

Detailed Syllabus
Lab-wise Breakup

Course Code	15B11CI373	**Semester** EVEN	**Semester:** IV **Session:** 2021 -2022 **Month from** Feb to Jun
Course Name	Computer Organization and Architecture Lab		
Credits	1	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Amarjeet Kaur
	Teacher(s) (Alphabetically)	Amarjeet Kaur, Dr Pawan K. Upadhyay

COURSE OUTCOMES		**COGNITIVE LEVELS**
C273.1	Implement basic ALU of 2-bit and 4-bit computer using hardwired simulation tool	Apply Level (Level 3)
C273.2	Initialization and fetching of data from specific memory using various addressing mode of 8085 and 8086	Understand Level (Level 2)
C273.3	Develop 8086 assembly language programs using software interrupts and various assembler directives.	Apply Level (Level 3)
C273.4	Develop Microprocessor Interfacing program using PPI for various external devices	Apply Level (Level 3)
C273.5	Develop MIPS assembly language programs using software interrupts and various assembler directives.	Apply Level (Level 3)
C273.6	Create application and its software using 8085/8086 microprocessor or microcontrollers	Create Level (Level 6)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	COA Hardwired simulation tool	Realize the truth table of various gates like as AND, OR, NOT, XOR, NAND and NOR.,Conversion of universal gates,Design the half adder and full adder circuits, Ripple adder logic circuit, 4 x1 multiplexor circuit and realize the variousinput output logic based on control, 4X1 multiplexor with NAND gates logic circuits	C273.1
2.	Combinational circuits	Design the subtractor circuits with defined bit logic, Adder-subtractor logic circuits, The odd frequency divider circuits, Carry lookup adder, Carry select and carry save, Adder circuits by modifying the ripple carry adder logicgiven in module-1.,Timing diagram of all four adder circuits and comparetheir performance, Decoder circuits with defined logic, 4-bit ALU circuits with	C273.1

		defined operation logic.	
3.	8085 Simulator Introduction	Understanding Hardware Specification of the **8085 Simulator** indetail, Add two 8-bit numbers from load sample programfrom file menu, assemble and execute it step by step andview the contents of registers and memory.,Basic Data transfer instructions, Arithmetic instructions, Logical instruction of 8085 using sample programs with note changes in flags.	C273.2
4.	8085 Programming (Simple)	8085 Assembly Programming: Basic Arithmetic (like addition, subtraction, multiplication, division etc), Array (sum , reverse, average copy etc) etc and explore more about Arithmetic, Logical and Flow control Instructions	C273.2
5.	8085 Programming (Complex)	8085 Assembly Programming: Logical and Data transfer (like Min, Max, Even/odd, Sorting etc), more complex program(like Factorial, Link list etc) , String etc and explore more about Arithmetic, Logical and Flow control Instructions, Interfacing with 8255	C273.2, C273.4
6.	8086(MASM/emu 86)	8086 Assembly Programming: Arithmetic (like addition, subtraction, multiplication, division etc), Logical and Data transfer (like Min, Max, Even/odd, Sorting etc), BIOS interrupt (I/O for read and write), String etc and explore more about Arithmetic, Logical, Flow control and Software Interrupt Instructions using MASM/emu86	C273.3
7.	MIPS(MARS) simulator	MIPS Assembly Programming: Arithmetic (like addition, subtraction, multiplication, division etc), Logical and Data transfer (like Min, Max, Even/odd, Sorting etc), Complex program (Factorial, Fibonacci etc), String etc and explore more about Arithmetic, Logical, Flow control Instructions using MARS Simulator.	C273.5
8.	Projects	Students are expected to create an hardware and software co-designed application based on 8085/ 8086/ MIPS/ Other controller (like Arduino) / Small Size computer (like Raspberry Pi)programmingeither in assembly or high level language.	C273.6

Project based learning: Project in COA lab is an integral part of the lab. Student form group size 2-3, and discuss the project idea with their lab faculty before finalizing. All projects are based on hardware and hardware components like microprocessor microcontrollers (like Arduino), microcomputer (like Raspberry pi), various sensors (like temperature sensor, humidity sensor etc), cams (like webcam), etc. are used. Programming language is used as per processor/controller. Students develop projects/prototypes to interact with physical environment, control physical object with software which is base of IoT and embedded system. Students learn various processor architecture as well as their programming languages. This helps students to understand how to develop IoT based products and embedded systems.

Evaluation Criteria

Components	**Maximum Marks**
Lab Test 1	20
Lab Test 2	20
Day to Day	60 (Lab evaluations, Project, Assignments, 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.	William Stallings, Computer Organization and Architecture–Designing for Performance, 9th Edition, Pearson Education, 2013.
2.	Nicholas Carter, Schaum's outline of Computer Architecture, Tata McGraw Hill, 2017
3.	John L. Hennessy and David A Patterson, Computer Architecture A quantitative Approach, Morgan Kaufmann / Elsevier, Sixth Edition, 2017
4.	M. Morris Mano, Computer System Architecture, Prentice Hall of India Pvt Ltd, Fourth edition, 2002. ISBN: 81-203-0855-7.
5.	Microprocessor Architecture Programming and Applications with the 8085 [HB]-6/e. 25 September 2014. by Ramesh Gaonkar .
6.	The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro-Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit Extensions : Architecture, Programming, and Interfacing. Barry B. Brey, Pearson Education India, 2012.
7.	http://nptel.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/comp_org_arc/web/
8.	http://cs.nyu.edu/~gottlieb/courses/2010s/2011-12-fall/arch/class-notes.html
9.	http://www.cse.iitm.ac.in/~vplab/courses/comp_org/LEC_INTRO.pdf
10.	http://www.cs.iastate.edu/~prabhu/Tutorial/title.html
11.	http://www.cag.csail.mit.edu/
12.	http://www.research.ibm.com/compsci/arch

Detailed Syllabus
Lecture-wise Breakup

Subject Code	15B11HS111	**Semester:** EVEN	**Semester:** IV **Session:** 2021-2022 **Month from** Feb to Jun
Subject Name	Life Skills		
Credits	2	**Contact Hours**	1-1-0
Faculty (Names)	**Coordinator(s)**	Dr. Praveen Sharma & Dr. Priyanka Chhaparia	
	Teacher(s) (Alphabetically)	Dr. Badri Bajaj, Dr. Ekta Srivastava, Dr Praveen Sharma, Dr. Priyanka Chhaparia	

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

Module No.	**Title 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-1	Emotional Intelligence, Stress Management, Goal Setting	4
3.	Individual-II	Dimensions of 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 Lectures	14

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Project, assignment, class participation)
Total	**100**

Project Based Learning: Students are supposed to form a group (Maximum 5 students in each group) and identify a Women leader of their choice. They are supposed to do the in-depth study on the leadership style of their identified leader and explain it. They are also supposed to explain identified women leader's personality traits by referring the Big five personality traits model. The project provides understanding to students on Women leadership and personality traits.

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, 16th Edition, Prentice-Hall India 2016
2.	Smith, E., Hoeksema, S., Fredrickson, B., & Loftus, G. Introduction to Psychology. Thompsons and Wadsworth Co, 2009
3.	Daniel Goleman, Working With Emotional Intelligence, Bantom Books 2000
4.	Sue Bishop, Assertiveness Skills Training, Viva Books, New Delhi, 2009
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., *"New Paradigms for Gender Inclusivity*", PHI Pvt Ltd 2012

Detailed Syllabus

Lecture-wise Breakup

Course Code	15B11MA301	**Semester** Even	**Semester:** IV **Session:** 2021-22 **Month from** Feb to Jun
Course Name	Probability and Random Processes		
Credits	4	**Contact Hours**	3-1-0
Faculty (Names)	**Coordinator(s)**	Prof. B. P. Chamola, Dr. Rajanish Kumar Rai	
	Teacher(s) (Alphabetically)	Prof. B. P. Chamola, Dr. Rajanish Kumar Rai, Dr. Pato Kumari, Dr. Yogesh Gupta, Dr. Vipin Chandra Dubey, Dr. Shikha Pandey, Dr Lakhveer Kaur, Dr. Amit Srivastava, Dr. Amita Bhagat, Dr. Neha Ahlawat, Dr. Pinkey Chauhan	

COURSE OUTCOMES:		**COGNITIVE LEVELS**
C201.1	Explain the basic concepts of probability, conditional probability and Bayes' theorem	Understand Level (C2)
C201.2	Identify and explain one- and two-dimensional random variables along with their distributions and statistical averages	Apply Level (C3)
C201.3	Apply some probability distributions to various discrete and continuous problems.	Apply Level (C3)
C201.4	Solve the problems related to the component and system reliabilities.	Apply Level (C3)
C201.5	Identify the random processes and compute their averages.	Apply Level (C3)
C201.6	Solve the problems on Ergodic process, Poisson process and Markov chain.	Apply Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Probability	Three basic approaches to probability, conditional probability, total probability theorem, Bayes' theorem.	5
2.	Random Variables	One dimensional random variables (discrete and continuous), distribution of a random variable (density function and cdf). MGF and characteristic function of a random variable and its utility. Bivariate random variable, joint, marginal and conditional distributions, covariance and correlation.	8
3.	Probability Distributions	Bernoulli, binomial, Poisson, negative binomial, geometric distributions. Uniform, exponential, normal, gamma, Earlang and Weibull distributions.	8

4.	Reliability	Concept of reliability, reliability function, hazard rate function, mean time to failure (MTTF). Reliability of series, parallel, series-parallel, parallel-series systems.	6
5.	Random Processes I	Introduction, Statistical description of random processes, Markov processes, processes with independent increments. Average values of random processes. Strict sense and wide sense stationary processes, their averages. Random walk, Wiener process. Semi-random telegraph signal and random telegraph signal process. Properties of autocorrelation function.	7
6.	Random Processes II	Ergodic processes. Power spectral density function and its properties. Poisson processes. Markov chains and their transition probability matrix (TPM).	8
Total number of Lectures			**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Quiz, Assignments, Tutorials)
Total	**100**

Project based learning: Each student in a group of 4-5 will apply the concepts of probability distributions, Poisson processes and Markov chains to solve some practical problems.

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.	**Veerarajan, T.,** Probability, Statistics and Random Processes, 3rd Ed. Tata McGraw-Hill, 2008.
2.	**Papoulis, A. & Pillai, S.U.,** Probability, Random Variables and Stochastic Processes, Tata McGraw-Hill, 2002.
3.	**Ross, S. M.,** Introduction to Probability and Statistics for Engineers and Scientists, 4th Ed., Elsevier, 2004.
4.	**Palaniammal, S.,** Probability and Random Processes, PHI Learning Private Limited, 2012.
5.	**Prabha, B. and Sujata, R.,** Statistics, Random Processes and Queuing Theory, 3rd Ed., Scitech, 2009.

Detailed Syllabus
Lecture-wise Breakup

Course Code	16B1NHS332	**Semester:** Even	**Semester:** IV **Session:** 2021-2022 **Month from:** Feb to Jun
Course Name	Quantitative Methods for Social Sciences		
Credits	3	**Contact Hours**	2-1-0

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

COURSE OUTCOMES		**COGNITIVE LEVELS**
C206-3.1	*Demonstrate* the key concepts of different quantitative methods used in social sciences.	Understand Level- (C2)
C206-3.2	*Classify and summarize the* data to be used for analysis.	Understand Level- (C2)
C206-3.3	*Apply* the theoretical concept to perform basic data analysis in social sciences.	Apply Level –(C3)
C206-3.4	*Examine* different statistical methods and be able to discuss the merits and limitations of a particular method	Analyze Level –(C4)
C206-3.5	*Recommend* 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 Concepts	Mathematical basis of Managerial Decision-Concepts, Frequency Distribution and their Analysis	3

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+ Project+Viva-voce)
Total	**100**

Project based Learning: Students have to form a group (maximum 5 students in each group) and have to do a project on quantitative research techniques and strategies. The project emphasizes on objective measurement and the statistical analysis of data collected through surveys, questionnaires and polls. The students will gain a first-hand experience of data analysis which will help them in entering an analytical or research career.

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.
4.	Stockemer, D.Quantitative Methods for Social Sciences: A Practical Introduction with examples in SPSS and STATA 1st ed., Springer International Publishing, 2019
5.	Kaplan, DW. The SAGE Handbook of Quantitative Methodology for the Social Sciences. 1st ed. SAGE Publications Inc,2004

Detailed Syllabus
Lecture-wise Breakup

Course Code	16B1NHS431	Semester **Even**	**Semester: IV Session: 2021-22** **Month from** Feb to Jun
Course Name	Human Resource Management		
Credits	3	**Contact Hours**	2-1-0

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

COURSE OUTCOMES		**COGNITIVE LEVELS**
C206-1.1	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)
C206-1.2	Apply various tools and techniques in making sound human resource decisions.	Apply level (C3)
C206-1.3	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)
C206-1.4	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	Factors influencing industrial relations - State Interventions and Legal Framework - Role of Trade unions - Collective Bargaining - Workers' participation in management. Trends	5

	in Human Resource Management	in Human Resource Management: Analytics, Artificial Intelligence	
		Total number of Lectures	**28**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25(Project, assignment, class performance, attendance)
Total	**100**

Project-based learning: Each student in a group 4 to 5 will select a company which is registered in India. To make subject application based, the student will analyze Human Resource management policies and employed performing different functions at various levels related to recruitment, training, development, performance appraisal and compensation.

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.	G. Dessler and B. Varrkey, *Human Resource Management, 15e*. Pearson Education India, 2005.
2.	V. S. P. Rao and V. H. Krishna, *Management: Text and cases*. Excel Books India, 2009.
3.	K. Aswathappa, *Human resource management: Text and cases*. Tata McGraw-Hill Education, 2013.
4.	P. M. Noe, R. A., Hollenbeck, J. R., Gerhart, B. A., & Wright, *Fundamentals of Human Resource Management*. Tata McGraw-Hill Education, 2019.
5.	B. Pattanayak, "Human Resource Management, PHI Learning Pvt," *Ltd., New Delhi*, vol. 2, 2018.
6.	D. A. DeCenzo, S. P. Robbins, and S. L. Verhulst, *Fundamentals of human resource management*. John Wiley & Sons, 2016.

Detailed Syllabus
Lecture-wise Breakup

Course Code	18B11EC213	**Semester** Even	**Semester:** IV **Session:**2021 -2022 **Month from** Feb to Jun
Course Name	Digital Systems		
Credits	4	**Contact Hours**	3-1-0

Faculty (Names)	**Coordinator(s)**	Vimal Kumar Mishra, Monika
	Teacher(s) (Alphabetically)	Atul Kumar, Jasmine Saini, Juhi Gupta, Nisha Venkatesh, Ruby Beniwal, Saurabh Chaturvedi

COURSE OUTCOMES		**COGNITIVE LEVELS**
C207.1	Familiarize with the fundamentals of number system, Boolean algebra and Boolean function minimization techniques.	Apply Level (C3)
C207.2	Analyze and design combinational circuits using logic gates.	Analyze Level (C4)
C207.3	Analyze state diagram and design sequential logic circuits using flip flops.	Analyze Level (C4)
C207.4	Understand the classification of signals & systems and learn basic signal operations & Fourier analysis.	Analyze Level (C4)
C207.5	Understand various steps involved in digitization and transmission of a signal.	Understand Level (C2)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Boolean Function Minimization Techniques and Combinational Circuits	Number systems, Karnaugh Map, Quine-McCluskey method, Prime Implicants, Essential Prime implicants, Adder, Subtractor, Multiplexer, Demultiplexer, Encoder, Decoder, Comparator and Code Converters	9
2.	Flip Flops	SR, JK, Master Slave JK, T And D; Excitation Tables, Conversion of Flip-Flops	3
3.	Counters	Synchronous and Asynchronous Counters, Design of Counters Using Flip- Flops, Registers, Shift Registers, Counters Using Shift Registers; State Diagram Design, Analysis of Sequential Circuits Using Flip-Flops	9
4.	Signals and systems	Signals and classification of signals: Continuous time anddiscrete time, Even and odd, periodic and non-periodic,Energy and Power signals, Basic signals: unit impulse, unitstep and unit ramp. Basic operations of signals: timescaling,time- shifting, etc. Systems and classification of systems: continuous and discrete, Linear and non-linear, causal and non-causal.	5
5.	Fourier Analysis	Fourier Series, Fourier Transform Fourier Transform pair of standard signals and properties of Fourier transform. Discrete Fourier Transform (DFT), Properties and DFT, standard signal pairs.	5

6.	Sampling and Pulse code modulation	Sampling theorem, Proof of sampling theorem, Nyquist rate and Nyquist interval. Quantization (Mid rise and Mid tread), Quantization error, PCM (modulator and demodulator), Transmission bandwidth in PCM, Signal to quantization noise ratio of PCM.	6
7.	Digital modulation techniques and Line coding	BASK, BFSK and BPSK modulation techniques with modulator and demodulator. Linear DM and basics of ADM. Line coding formats- UNRZ, URZ, BNRZ, BRZ, AMINRZ, AMI-RZ and Manchester.	5
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Assignment = 10, Quiz = 5, Attendance = 10)
Total	**100**

Program Based Learning: Students will be able to design and implement the projects using decoders, comparators and multiplexers. Desiging of new flip flops, counters and shift resistors enhance the application ability in students. Applying DFT and FFT to design novel systems also develop aptitude among students. Analog to digital signal transimission techniques and several digital communication techniques develop latest knowledge wireless/communication based Industries.

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.	S. Salivahanan, and S. Arivazhagan, “Digital circuits and design”, Vikas publishing house PVT Limited. Fifth edition (March 2018)
2.	Oppenheim, Alan V., Alan S. Willsky, and Syed Hamid Nawab. "Signals and Systems," Prentice-HallEnglewood Cliffs 2 edition (2015)
3.	S. Haykin, “Digital Communications Systems”, John Wiley & Sons, 1 edition, 2013
4.	H. Taub & D. L. Schilling, “Principles of Communication Systems”, 2nd edition, McGraw-Hill HigherEducation. 3 edition (September 2007)

Detailed Syllabus
Lab-wise Breakup

Course Code	18B15EC213	**Semester:** Even	**Semester:** IV **Session:** 2021 -2022 **Month from** Feb to Jun
Course Name	Digital Systems Lab		
Credits	1	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Mandeep Singh Narula
	Teacher(s)	Jasmine Saini, Neetu Singh, Mandeep Singh Narula, Monika, Gaurav Khanna

COURSE OUTCOMES		**COGNITIVE LEVELS**
C208.1	Recall the basics of combinational digital circuits and their implementation.	Remember Level (C1)
C208.2	Recall the basics of sequential digital circuits and its implementation.	Understand Level (C2)
C208.3	Apply the theory of signals & systems and digital signal processing.	Apply Level (C3)
C208.4	Apply the concepts of digital communication.	Apply Level (C3)

Module No.	**Title of the Module**	**List of Experiments**	**COs**
1.	Introduction to basic logic gates	Verification of truth tables of basic logic gates and their realization using universal logic gates using MATLAB	C208.1
2.	Basics of adder and substractor circuits	Design and simulate half adder, half subtractor, full adder, and full subtractor using MATLAB	C208.1
3.	Decoder logic circuits	Design and simulation of binary to gray and gray to binary code converter using MATLAB.	C208.1
4.	Multiplexer logic circuits	Design and simulation of 2-to-1, 4-to-1, and 8-to-1 multiplexers using MATLAB	C208.1
5.	Introduction to sequential circuit: SR-Latch, D and JK Flip Flop	(a) Realization of SR Latch using using MATLAB. (b) Realization of D flip flop using using MATLAB. (c) Realization of JK flip flop using using MATLAB	C208.2
6.	Continuous time and discrete time signals	Write Matlab programs for the generation of elementary continuous time signals and discrete time signals.	C208.3
7.	Sampling and reconstruction process	Write Matlab program to study the sampling and reconstruction process.	C208.3

8.	Quantization process of the signals.	Write Matlab program to study the quantization process of sinusoid signals.	C208.3
9.	Digital Modulation Techniques	Write Matlab programs to compute Discrete Fourier Transform (DFT) and Inverse Discrete Fourier Transform (IDFT) for the spectral analysis of signals.	C208.3
10.	Introduction to Discrete Fourier Transform (DFT) and Inverse Discrete Fourier Transform (IDFT)	Write Matlab programs to study the binary phase shift keying and frequency shift keying modulation process.	C208.4

Evaluation Criteria

Components	**Maximum Marks**
Mid Term Viva	20
End Term Viva	20
Report file, Attendance, and D2D	60
Total	**100**

Project based learning: Students will learn about Combinational and Sequential logic circuits and design them using open-source software MATLAB. Additionally, students in group sizes of two-three will realize various applications of Digital Systems employing these circuits.

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.	Salivahanan, S., and S. Arivazhagan. *Digital circuits and design*. Vikas publishing house PVT Limited. Fifth edition (March 2018)
2.	Oppenheim, Alan V., Alan S. Willsky, and Syed Hamid Nawab. "Signals and Systems," *Prentice-Hall Englewood Cliffs* **2 edition (2015)**
3.	S. Haykin *Digital Communications Systems.* John Wiley & Sons, 1 edition,2013
4.	H. Taub & D. L. Schilling, *Principles of Communication Systems*, 2nd edition, McGraw-Hill Higher Education. ***3 edition (September 2007)***

Detailed Syllabus
Lecture-wise Breakup

Course Code	21B19CS211	**Semester:** Even	**Semester** IV **Session** 2021-2022 **Month from:** Feb to Jun
Course Name	Programming Fundamentals		
Credits	1	**Contact Hours**	1

Faculty (Names)	**Coordinator(s)**	Mahendra K Gurve(62), Pulkit M(128)
	Teacher(s) (Alphabetically)	Mahendra K Gurve(62), Pulkit M(128)

COURSE OUTCOMES		**COGNITIVE LEVELS**
C215.1	Explain various data types, constructs of conditional programming and programming by loops	Understand Level (Level 2)
C215.2	Explain need of array and structures	Understand Level (Level 2)
C215.3	Apply and implement functions with or without pointers for different problems	Apply Level (Level 3)
C215.4	Demonstrate programs in C++ to implement OOPs concepts related to objects, classes, constructor, destructor, and friend function.	Apply Level (Level 3)
C215.5	Excecute programs in C++ using OOPs concept like encapsulation, inheritance, polymorphism, abstraction, stacks, queues, searching and sorting.	Apply Level (Level 3)

Module No.	**Subtitle of the Module**	**Topics in the module**	**No. of Lectures**
1	C Programming Fundamentals	Datatypes, Conditional Statements: IF, IF-ELSE, ESLEIF, Switch-Case, Looping: FOR, WHILE, DO-WHILE.	2
2	Structures, Pointers & Arrays	Structure Definition, Structure Handling, Introduction to Pointers, Arrays.	2
3	C Programming Functions	Function Definition, Function Declaration, Call by Value, Call by Reference, Recursions.	1
4	Object Oriented Fundamentals using C++	Objects, Classes, Methods, implementing functions in the class, use of scope resolution operator, Access Modifiers, static functions and static data members, constructor and destructors,	2
5	OOP Advanced	Inheritance: single, multiple, multi-level and	3

	Concepts	hybrid, Polymorphism: function and operator overloading, virtual member functions, abstract base classes and pure virtual functions, Introduction to SDLC.	
6	Basic Data Structures using C	Stacks, Stack, Queue (array-based implementation). Circular Queue and Deque using array, 1D-Linked list, 2D-Link list application, Binary trees, Binary tree Implementation: array and pointer based	2
7	Searching & Sorting	Searching Techniques: Linear Search, Binary Search; Sorting: Bubble Sort, Insertion Sort, Selection Sort.	2
		Total number of Lectures	**14**

Evaluation Criteria

Components	**Maximum Marks**
Test-1	20
Test-2	20
End Term	35
TA	25 (Project, Assessment, Attendance)
Total	**100**

Project based learning: Each student in a group of 2-3 will have to develop a project based on different real-world problems. Students have to study the C, C++ and Data Structures before finalizing the objectives. Project development will enhance the knowledge and employability of the students in IT sector.

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	Herbert Schildt. “The Complete Reference C++ ”, 4th Edition, TMH, 2017
2	Yashavant P Kanetkar,”Let Us C” (2016). BPB Publications, 15th Edition.
3	Herbert Schildt. “The Complete Reference C ”, 4th Edition, TMH, 2017
4	E Balaguruswamy , Object Oriented Programming With C++ , 7th Edition , TMH, 2017

Detailed Syllabus
Lab-wise Breakup

Course Code	21B19CS212	**Semester:** Even	**Semester** IV **Session** 2021-2022 **Month from** Feb to Jun
Course Name	Programming Fundamentals Lab		
Credits	1	**Contact Hours**	2

Faculty (Names)	**Coordinator(s)**	Mahendra K Gurve(62), Pulkit M(128)
	Teacher(s) (Alphabetically)	Mahendra K Gurve(62), Pulkit M(128)

COURSE OUTCOMES		**COGNITIVE LEVELS**
C275.1	Explain various data types, constructs of conditional programming and programming by loops	Understand Level (Level 2)
C275.2	Explain need of array and structures	Understand Level (Level 2)
C275.3	Apply and implement functions with or without pointers for different problems	Apply Level (Level 3)
C275.4	Demonstrate programs in C++ to implement OOPs concepts related to objects, classes, constructor, destructor, and friend function.	Apply Level (Level 3)
C275.5	Execute programs in C++ using OOPs concept like encapsulation, inheritance, polymorphism, abstraction, stacks, queues, searching and sorting.	Apply Level (Level 3)

Module No.	**Subtitle of the Module**	**Topics in the module**	**No. of Labs**
1	C Programming Fundamentals	Datatypes, Conditional Statements: IF, IF-ELSE, ESLEIF, Switch-Case, Looping: FOR, WHILE, DO-WHILE.	4
2	Structures, Pointers & Arrays	Structure Definition, Structure Handling, Introduction to Pointers, Arrays.	4
3	C Programming Functions	Function Definition, Function Declaration, Call by Value, Call by Reference, Recursions.	2
4	Object Oriented Fundamentals using C++	Objects, Classes, Methods, implementing functions in the class, use of scope resolution operator, Access Modifiers, static functions and static data members, constructor and destructors,	4
5	OOP Advanced	Inheritance: single, multiple, multi-level and	6

	Concepts	hybrid, Polymorphism: function and operator overloading, virtual member functions, abstract base classes and pure virtual functions, Introduction to SDLC.	
6	Basic Data Structures using C	Stacks, Stack, Queue (array-based implementation). Circular Queue and Deque using array, 1D-Linked list, 2D-Link list application, Binary trees, Binary tree Implementation: array and pointer based	4
7	Searching & Sorting	Searching Techniques: Linear Search, Binary Search; Sorting: Bubble Sort, Insertion Sort, Selection Sort.	4
		Total number of Labs	**28**

Evaluation Criteria

Components	**Maximum Marks**
Mid Term Test-1	20
End Term Test-2	20
Day To Day	60 (Project, Assessment, Attendance)
Total	**100**

Project based learning: Each student in a group of 2-3 will have to develop a project based on different real-world problems. Students have to study the C, C++ and Data Structures before finalizing the objectives. Project development will enhance the knowledge and employability of the students in IT sector.

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	Herbert Schildt. “The Complete Reference C++ ”, 4th Edition, TMH, 2017
2	Yashavant P Kanetkar,”Let Us C” (2016). BPB Publications, 15th Edition.
3	Herbert Schildt. “The Complete Reference C ”, 4th Edition, TMH, 2017
4	E Balaguruswamy , Object Oriented Programming With C++ , 7th Edition , TMH, 2017