Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11CI311	**Semester** Odd **(specify Odd/Even)**	**Semester** III **Session** 2018 -2019 **Month from** July to December 2018
Course Name	Data Structures		
Credits	4	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	TRIBHUWAN KUMAR TEWARI, MUKESH SARASWAT
	Teacher(s) (Alphabetically)	ANKITA WADHWA , ANURAG GOEL, ASHISH TRIPATHI, BINDU VERMA, K VIMAL KUMAR, MANISH KUMAR THAKUR, SHERRY GARG, TRIBHUWAN KUMAR TEWARI, VIKAS SAXENA

COURSE OUTCOMES		**COGNITIVE LEVELS**
C210.1	Develop programs using object oriented programming (C++) including STL, conversion of a recursive algorithm to non-recursive algorithm using stack, the stack and queue based solutions for various computing problems	Apply Level (Level 3)
C210.2	Construct test cases for their programs and debug the code.	Apply Level (Level 3)
C210.3	Explain abstract data types and design implementations, using abstraction functions to document them.	Understanding Level (Level 2)
C210.4	Implement and compare various searching(Linear, Binary, Interpolation, Median) and sorting (Bubble, Selection, Insertion, Merge, Radix, and Quick)algorithms and interpret their time complexities;	Understanding Level (Level 2)
C210.5	Demonstrate and implement the various operations (Storage, Search, Traverse, Insertion, Deletion, Updating, etc.) on different tree data structures (binary trees, k-ary trees, binary search trees, AVL tree, heap, B tree and B+ tree)	Understanding Level (Level 2)
C210.6	Demonstrate and implement the various operations (Storage, Search, Traverse, Insertion, Deletion, Updating, Path finding, Minimum spanning tree etc.) on different Graph data structures.	Understanding Level (Level 2)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Basics of OOP	Class diagram, Polymorphism, Template, STL, Introduction to SDLC, Testing fundamentals and test-case generation,	8
2.	Searching and Sorting	Searching, Sorting (Merge, Quick, Radix, Bucket), Simple fractal graphics;	6
3.	Liners data	ADT, Time and space complexity, analysis of algorithms,	6

	Structures	Stack & Queue based applications, Recursion removal,	
4.	Non-linear Data Structures	Binary tree, k-ary tree, BST, Threaded Tree, AVL Tree, B Tree, B+ Tree, Heap and Priority Queue, Hashing, Set, Multiset, Dictionary, Maps, Graphs and basic algorithms, e.g., traversal, spanning tree, isomorphism. Data structure evaluation.	16
5.	Advanced Programming issues	Memory management (garbage collection), Assertion, Defensive programming (e.g. secure coding, exception handling), Code reviews, Program correctness (The role and the use of contracts, including pre- and post-conditions), Unit testing, Event-Driven and Reactive Programming, Debugging techniques.	6
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Atendance, Discipline(10), Assignment(10),Quiz(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	Object Oriented Programming With C++, E Balagurusamy, TMH,2000
2	Object Oriented Programming in C++, Robert Lafore, SAMS, 2002
3	Fundamanetal of Data Structures in C++, Horobitz and Sahni and Mehta, 2009, Galgotia
4	Theory and Problems of Data Structures with C++, Shaum's outline, McGraw-hill, 2000
5	Course Material supplied at SM

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17CI371	**Semester** Odd **(specify Odd/Even)**	**Semester** III **Session** 2018 -2019 **Month from** July 2018
Course Name	Data Structures Laboratory		
Credits	2	**Contact Hours**	0-0-2

Faculty (Names)	**Coordinator(s)**	Anurag Goel
	Teacher(s) (Alphabetically)	Akanksha Bhardwaj, Anurag Goel, Arti Jain, Ashish Kumar Tripathi, Avinash Kr. Pandey, Bindu Verma, Mukesh Saraswat, Raju Pal, Sudhanshu Kulshrestha

COURSE OUTCOMES		**COGNITIVE LEVELS**
C270.1	Develop programs using object oriented programming (C++) including STL	Apply Level (Level 3)
C270.2	Develop various searching (Linear, Binary, Interpolation, Median) and sorting (Bubble, Selection, Insertion, Merge, Radix, and Quick) algorithms	Apply Level (Level 3)
C270.3	Experiment with lists, multi linked list for sparse matrix representation, rat in a maze problem, n queens problem, etc.	Apply Level (Level 3)
C270.4	Develop the programs for different tree data structure operations like, storage, search, traverse, insertion, deletion, updating, etc. on binary trees, k-ary trees, binary search trees, AVL trees, heap trees, B trees and B+ trees.	Apply Level (Level 3)
C270.5	Develop the various operations (Storage, Search, Traverse, Insertion, Deletion, Updating, Path finding, Minimum spanning tree etc.) on different Graph data structures.	Apply Level (Level 3)
C270.6	Develop the programs for priority queue and hashing techniques.	Apply Level (Level 3)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Introduction to Object oriented Programming	Objects & classes, Class relationships, Polymorphism, Templates, STL, UML diagram – Class Diagram	C270.1
2.	Sorting & Searching	Merge Sort, Quick sort, Shell sort, Bucket Sort, Median search, interpolation search, Skip search	C270.2
3.	Lists	Introduction to lists, multi linked list, Applications - sparse matrix representation, rat in a maze problem, n queens problem	C270.3
4.	Trees	Binary Tree, Binary Search tree, nary tree, AVL Tree, B Tree, B+ Tree.	C270.4
5.	Heaps	Introduction, Binary heap, Binomial heap, Pairing heap	C270.4

6.	Graph	Introduction to graphs, Representation – adjacency list, adjacency matrix, Traversal – BFS, DFS, Minimum spanning tree – Prims and Kruskal's algorithm, Shortest path – Dijkstra algorithm and Floyd–Warshall algorithm	C270.5
7.	Hashing	Introduction to hashing, Collision resolution – open and closed hashing methods, Cuckoo hashing, Coalesced hashing, Perfect hash function, Universal Hashing	C270.6

Evaluation Criteria

Components	**Maximum Marks**
Lab Test -1	20
Lab Test -2	20
Lab Evaluations	10
Project	20
Quiz/Viva	15
Attendance	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.	Yedidyah Langsam, Moshe J., Augenstein and Aaron M. Tenenbaum: Data Structures Using C and C++, 2nd Edition, PHI, 2001
2.	Kurt Mehlhorn: Data Structures and Algorithms 3, Springer, 1984
3.	Dinesh P Mehta, Sartaj Sahani: Handbook of Data Structure and Applications, Chapman & Hall, 2004
4.	Mark Allen Weiss: Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson
5.	Sahni: Data Structures, Algorithms and applications in C++, Universities press, Hyderabad, 2005
6.	Kruse, Tonso, Leung: Data Structures and Program Design in C, 2rd Edition, Pearson Education Asia, 2002
7.	Cormen et al: Introduction to Computer Algorithms, 2nd edition , PHI New Delhi 2003
8.	Aho, Hopcraft, Ullman: Data Structures and Algorithms, Pearson Education Asia (Adisson Wesley), New Delhi, 2001
9.	Standish: Data Structures in Java, Pearson Education Asia (Adisson Wesley), New Delhi, 2000
10.	Knuth: The Art of Computer programming Vol I, Vol III, 2nd edition , Pearson Education Asia (Adisson Wesley), New Delhi, 2002

Detailed Syllabus

Lecture-wise Breakup

Course Code	15B11CI312	**Semester : Odd**	**Semester :** Odd **Session :** 2018-2019 **Month from** July'18 to Dec'18
Course Name	Database Systems & Web		
Credits	3-1-0	**Contact Hours**	**4**

Faculty (Names)	**Coordinator(s)**	Dr. Himani Bansal
	Teacher(s) (Alphabetically)	Anuradha Gupta, Kritika Rani, Ruby Rani

COURSE OUTCOMES		**COGNITIVE LEVELS**
C212.1	Explain the basic concepts of Database systems and Web components.	Understand Level (Level II)
C212.2	Model the real world systems using Entity Relationship Diagrams and convert the ER model into a relational logical schema using various mapping algorithms	Apply Level (Level III)
C212.3	Develop a simple web application with client and server side scripting using Javascript and PHP and connect with a given relational database	Create Level (Level VI)
C212.4	Make use of SQL commands and relational algebraic expressions for query processing.	Apply Level (Level III)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction to Databases	Introduction to Databases, Physical Level of Data Storage, Structure of relational databases, Review of SQL Create, Insert, Update, Delete and Select Statements, Overview of NoSQL databases	4
2.	Web Architecture & Introduction	Motivation, characteristics and complexities of web applications, Basics, of Web Server and Application server, differences between web application and conventional software, architecture layers.	2
3.	Client Side Web Technology	SGML, HTML 5, DHTML, CSS, Java script	3
4.	Server Side Web Technology	PHP, Database Connectivity with PHP	4
5.	Database Design and ER Model	Entity type, Attributes, Relation types, Notations, Constraints, Extended ER Features	4
6.	Relational Model and Structured Query Language	SQL: Data Definition and Data Manipulation, Relational Algebra	9
7.	Procedural Language	PL/SQL: Stored Procedures, Functions, Cursors, Triggers	4

8.	Normalisation	Data Dependencies, 2NF, 3NF, BCNF, building normalised databases	5
9.	Transaction Management	Transactions, Concurrency, Recovery, Security	7
		Total number of 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.	Henry F Korth, Abraham Silberschatz, S. Sudurshan, Database system concepts, 5th Edition, McGraw-Hill,2006
2.	Ramez Elmasri , Shamkant B. Navathe , Fundamentals of Database Systems, 4th Edition, Pearson Education, 2006.
3.	Ramakrishnan, Gehrke, Database Management Systems, Mcgraw-Hill, 3rd Edition, Addison-Wesley,2006.
4.	Thomas Connolly, Carolyn Begg, Database Systems-A Practical Approach to design, Implementation and Management, 3rd Edition, Addison-Wesley,2002.
5.	"PHP and MYSQL Manual" by Simon Stobart and Mike Vassileiou
6.	"PHP and MYSQL Web Development" by Luke Welling and Laura Thomson(Pearson Education)

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17CI372	**Semester** Odd	**Semester** III **Session** 2018 -2019 **Month from** July **to** Dec 2018
Course Name	Database System and Web Lab		
Credits	0-0-1	**Contact Hours**	0-0-2

Faculty (Names)	**Coordinator(s)**	Kashav Ajmera, Anuradha Gupta
	Teacher(s) (Alphabetically)	Anuja Arora, Mahendra Kumar gurve, Megha rathi, parmeet kaur and Sandeep Kumar Singh Himani Bansal, Kritika Rani, Ravinder Ahuja

COURSE OUTCOMES (NBA Code – C271)		**COGNITIVE LEVELS**
C271.1	Explain the basic concepts of Database systems and Web components.	Understand (Level II)
C271.2	Develop web page using HTML, CSS with client side scripting using javascript.	Apply (Level III)
C271.3	Develop a simple web application with client and server side scripting using Javascript and PHP and connect to a given relational database.	Apply (Level III)
C271.4	Programming PL/SQL including stored procedures, stored functions, cursors, Triggers.	Apply (Level III)
C271.5	Design and implement a database schema for a given problem-domain and normalize a database.	Creating (Level VI)
C271.6	Design a Project based on database management	Create (Level VI)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Introduction to Database System and Web components	1. Introduction to Databases,Physical Level of Data Storage, Structure of relational databases. 2. Review of SQL Create, Insert, Update, Delete and Select Statements. 3. Characteristics and complexities of web applications, Basics, of Web Server and Application server.	C271.1
2.	Client Side Web Technology	1. Design web page using SGML, HTML 5, DHTML, CSS, Java script.	C271.2
3.	Server Side Web Technology	1. Develop a web application with client and server side scripting using Javascript. 2. Develop a web application with client and server side scripting using PHP. 3. Design web application with databased connectivity. 4. Design web application with entering user data into	C271.3 C271.5

		database. **5.** Desig web application for user - databse interaction through PHP.	
4.	Procedural Language	1. Write C program for storing data using procedures. 2. Write C program for storing data using stored functions. **3.** Write C program for storing data using cursors and Triggers.	C271.4
5.	Design, Database uses normalization based on identifying keys	1. Implement normalization techniqus on database(Data Dependencies, 2NF, 3NF, BCNF)	C271.5
6.	Project	1. Students are expected to designed web application based on Php or JavaScript and connect with databased to execute insert, update, retrieve and delete data queries.	C271.6

Evaluation Criteria

Components	**Maximum Marks**
Lab Test-1	**20**
Lab Test-2	**20**
Day-to-Day (Project, Lab Assessment, Attendance)	**60**
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.	Henry F Korth, Abraham Silberschatz, S. Sudurshan, Database system concepts, 5th Edition, McGraw-Hill,2006
2.	Ramez Elmasri , Shamkant B. Navathe , Fundamentals of Database Systems, 4th Edition, Pearson Education, 2006.
3.	Ramakrishnan, Gehrke, Database Management Systems, Mcgraw-Hill, 3rd Edition, Addison-Wesley,2006.
4.	Thomas Connolly, Carolyn Begg, Database Systems-A Practical Approach to design, Implementation and Management, 3rd Edition, Addison-Wesley,2002.
5.	"PHP and MYSQL Manual" by Simon Stobart and Mike Vassileiou
6.	"PHP and MYSQL Web Development" by Luke Welling and Laura Thomson(Pearson Education)

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11CI313	**Semester** Odd **(specify Odd/Even)**	**Semester** Third **Session** 2018 -2019 **Month from** July-December 2018
Course Name	Computer Organization and Architecture		
Credits	4	**Contact Hours**	3+1

Faculty (Names)	**Coordinator(s)**	Dr. Taj Alam, Dr Neeraj Jain
	Teacher(s) (Alphabetically)	Amarjeet Kaur, Hema N., Padam Kumar, Pawan Upadhyay, Taj Alam

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.	02
2.	Performance of Computer	Performance Measures For Computer System	02
3.	CPU Organization	Data-path and control, Instruction execution, Microinstruction.	03
4.	Data Path and Control	Hardwired designing for JC62. Micro-programmed control designing for JC62.	02
5.	Generalized Study of Instruction Set Architecture	Stack/accumulator/register-register/register-memory type of architecture. Memory addressing techniques.	02
6.	Types of Instruction	Data movement, Arithmetic/logic, Control flow, Addressing modes. Instruction format.	02
7.	Instruction Set Architecture (ISA)	8085 Architecture, 8085 Instruction Set, 8085 Instruction Format, 8085 Addressing Modes, 8085 instruction execution and datapath. 8085 Assembly programming for	05

	of 8085	simple applications.	
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.	05
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.	05
10.	Memory Organization	Hierarchal memory structure, Cache memory and organization. Memory interfacing for 8085 and 8086.	05
11.	I/O Organization	Programmed/Interrupt driven I/O, Direct memory access	04
12.	Pipelining	Introduction To Pipelining System and Pipelining in RISC based Systems (MPIS)	03
13.	Multicore Architecture	Generalized study of Multicore Machines.	02
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Attendance 10, Quiz 10, Tutorial 5 Marks)
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, Computer System Architecture, Prentice Hall of India Pvt Ltd, Fourth Edition, 2002.
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, Fourth Edition, 2007
4.	Ramesh Gaonkar, Microprocessor Architecture Programming and Applications with the 8085, Prentice Hall, Fifth Edition, 1996.
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, 2009.
6.	Nicholas Carter, Schaum's outline of Computer Architecture, Tata McGraw Hill, Second Edition, 2002.

Detailed Syllabus
Lab-wise Breakup

Course Code	**15B17CI373**	**Semester** Odd **(specify Odd/Even)**	**Semester** III **Session** 2018 -2019 **Month July-Dec 2018**
Course Name	**Computer Organization and Architecture Lab**		
Credits	1	**Contact Hours**	0-0-2

Faculty (Names)	**Coordinator(s)**	Ambalika Sarkar
	Teacher(s) (Alphabetically)	Dr. Devpriya Soni, Dr. Neeraj Jain, Dr. Rashmi, Santosh Verma

COURSE OUTCOMES		**COGNITIVE LEVELS**
C273.1	Implementation basic ALU of 2-bit and 4-bit computer using hardwired simulation tool	Apply Level (C3)
C273.2	Initialization and fetching of data from specific memory using various addressing mode of 8085 and 8086	Understand Level (C2)
C273.3	Develop 8086 assembly language programs using software interrupts and various assembler directives.	Apply Level (C3)
C273.4	Develop Microprocessor Interfacing program using PPI for various external devices	Apply Level (C3)
C273.5	Develop MIPS assembly language programs using software interrupts and various assembler directives.	Apply Level (C3)
C273.6	Create of application and its software using 8085/8086 microprocessor or microcontrollers	Create Level (C6)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	COA Hardwired simulation tool	1. Realize the truth table of various gates like as AND, OR, NOT, XOR, NAND and NOR. 2. Conversion of universal gates 3. Design the half adder and full adder circuits. 4. Realization of ripple adder logic circuit. 5. Design the 4 x1 multiplexor circuit and realize the various input output logic based on control. 6. Design the 4X1 multiplexor with NAND gates logic circuits.	**C273**.1
2.	Combinational circuits	1. Design the subtractor circuits with defined bit logic. 2. Design the adder subtractor logic circuits. 3. Design the odd frequency divider circuits Ex: input is F and output is F/3. 4. Design the carry lookup adder, carry select and carry save adder circuits by modifying the ripple carry adder logic given in **module-1.** 5. See the timing diagram of all four adder circuits and compare which of the adder circuits is best in performance. 6. Design the decoder circuits with defined logic. 7. Design the 4 bit ALU circuits with defined operation logic.	**C273.**1
3.	8085 Simulator	1. Understanding Hardware Specification of the	**C273.**2

	Introduction	Manosim in detail 2. Load add two 8-bit numbers from **load sample program** from file menu, assemble and execute it step by step and view the contents of registers and memory. 3. Study of basic data transfer instructions of 8085 using sample programs. 4. Study the basic Arithmetic instruction instructions of 8085 and perform the following on sample program and note the changes in the flag register. 5. Study the basic Logical instruction instructions of 8085 and perform the following on sample program and note the changes in the flag register.	
4.	8085 Programming (Simple)	1. Write assembly code for multiplying 2 numbers by the repeated addition method.i.e. 2 * 3 = 2 + 2 + 2. Note: you can NOT use the shift method or any other algorithm in this program. 2. Write an assembly program for adding elements present in 2 arrays and storing the corresponding sum in another array. 3. Write a assembly program for a link list having five node which can store the student name and id. 4. Write an assembly program for reverse the half of the string/Number . 5. Write an assembly program for extracting the vowels from the string "JIIT IS A UNIVERSITY:" . Assume the string is located at some memory location.	**C273.**2
5.	8085 Programming (Complex)	1. Write an assembly program for addition and subtraction of two 8-bit & 16 bit numbers using 8085 microprocessor. 2. Write an assembly program for Multiplication & Division of two 8-bit numbers. 3. Write an assembly program for Largest & Smallest among N numbers 4. Write an assembly program for Factorial of N number. 5. Sort the numbers stored from location 2000H in ascending order. 6. Sort the numbers stored from location 2000H in descending order. 7. You have 10 numbers stored from location 2000H. Store the odd numbers at location 3000H and even at 4000H. 8. Simulation of 8085 interfacing with 8255	**C273.**2, **C273.**4
6.	8086(MASM/emu86)	1. Write an assembly program for addition and subtraction of two 8-bit & 16 bit numbers using 8086 microprocessor. 2. Write an assembly program for Multiplication & Division of two 8-bit numbers. 3. Write an assembly program for Largest & Smallest among N numbers 4. Write an assembly program forFactorial of N number. 5. Sort the numbers stored from location 2000H in ascending order. 6. Sort the numbers stored from location 2000H in	**C273.**3

		descending order. 7. You have 10 numbers stored from location 2000H. Store the odd numbers at location 3000H and even at 4000H. 8. Program based on BIOS interrupt to read and write IO devices.	
7.	MIPS(MARS) simulator	1. Write a MIPS program to Take two values from the user, add these values and print the output. 2. Write a MIPS program to Take two values of your choice, add these values and print the output. 3. Write a MIPS program to add array of elements of size 10 and display it 4. Write a MIPS to compute first twelve Fibonacci numbers and put in array, then print.	**C273.**5
8.	Projects	Students are expected to create an hardware and software co-designed application based on 8085/8086/MIPS programming either in assembly or high level language.	**C273.**6

Evaluation Criteria

Components	**Maximum Marks**
Lab Test-1	20
Lab Test-2	20
Evaluation-1	10
Evaluation-2	10
Project	25
Attendance	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.	M. Morris Mano, Computer System Architecture, Prentice Hall of India Pvt Ltd, Fourth edition, 2002. ISBN: 81-203-0855-7.
2.	William Stallings, Computer Organization and Architecture–Designing for Performance, 9th Edition, Pearson Education, 2013.
3.	John L. Hennessy and David A Patterson, Computer Architecture A quantitative Approach, Morgan Kaufmann / Elsevier, Fourth Edition, 2007
4.	Microprocessor Architecture Programming and Applications with the 8085 [HB]-6/e. 25 September 2014. by Ramesh Gaonkar .
5.	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, 2009.
6.	Nicholas Carter, Schaum's outline of Computer Architecture, Tata McGraw Hill, 2006,
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

Course Code	15B11EC314	**Semester - Odd**	**Semester 3, Session 2018-2019** **Months July to Dec 2018**
Course Name	Introduction To Digital Systems		
Credits	**4**	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	1. Satyendra Kumar(CCC) 2. Ankur Bhardwaj
	Teacher(s) (Alphabetically)	Ankur Bhardwaj, Ekta Goel, Saurabh Chaturvedi, Sumegha Yadav Dr. Kaushal Nigam, Dr. Gopal Rawat and Dr. Parul Arora

COURSE OUTCOMES		**COGNITIVE LEVELS**
C211.1	familiarize with the fundamentals of number system, Boolean algebra and Boolean minimization techniques.	Applying (Level III)
C211.2	analyze and design combinational circuits using logic gates.	Analyzing (Level IV)
C211.3	analyze state diagram and design sequential logic circuits using flip flops.	Analyzing(Level IV)
C211.4	understand the classification of signals & systems and learn basic signal operations & Fourier analysis.	Analyzing(Level IV)
C211.5	understand various steps involved in digitization and transmission of a signal.	Understanding(Level II)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Minimization Techniques and Combinational Circuits	Number system, 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	8
4.	Signals and systems	Signals and classification of signals: Continuous time and discrete time, Even and odd, periodic and non-periodic , Energy and Power signals, Basic signals - unit impulse, unit step and unit ramp. Basic operations of signals: time-scaling, time- shifting, etc. Systems and classification of systems: cont 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	5

		standard signal pairs.	
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 modulaor and demodulator. DPCM, Linear DM and basics of ADM. Line coding formats- UNRZ, URZ, BNRZ, BRZ, AMI-NRZ, AMI-RZ and Manchester.	6
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25(10 – attendance,10 - Quiz/Assignment/tutorial,5 -Class performance)
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.	Salivahanan, S., and S. Arivazhagan. *Digital circuits and design*. Vikas publishing house PVT Limited.
2.	Oppenheim, Alan V., Alan S. Willsky, and Syed Hamid Nawab. "Signals and Systems," *Prentice-Hall Englewood Cliffs*
3.	S. Haykin *Digital Communications* John Wiley & Sons, 2001
4.	H. Taub & D. L. Schilling, *Principles of Communication Systems*, 2nd edition, McGraw-Hill Higher Education.

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17EC374	**Semester- Odd (specify Odd/Even)**	**Semester** III **Session** 2018 -2019 **Month from:** July 2018 to Dec. 2018
Course Name	DIGITAL SYSTEMS LAB		
Credits	2	**Contact Hours**	2 Hrs/Week

Faculty (Names)	**Coordinator(s)**	Kaushal Nigam, Saurabh Chaturvedi
	Teacher(s) (Alphabetically)	Satyendra Kumar, Gopal Rawat, Parul Arora

COURSE OUTCOMES		**COGNITIVE LEVELS**
C272.1	Recall the concepts of basic digital electronic circuits, such as logic gates and combinational circuits and Sequential Circuits	Remembering (Level I)
C272.2	Understand the MATLAB programming language and computing environment	Understanding(Level II)
C272.3	Apply the theory of digital electronics, signals and systems, digital signal processing and digital communication and write MATLAB programs	Applying (Level III)
C272.4	Analyze various digital circuits and systems, model them using MATLAB language and examine their simulation responses	Analysing (Level IV)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Study of logic gates and verification of Boolean Laws	To verify the truth table of basic logic gates AND, OR, NOT, NAND, NOR, XOR, XNOR and their realization using universal logic gates.	**C**272.1
2.	Design and Implementation of Adders and Subtractors	A) To realize Half adder, Full adder, Half Subtractor and Full Subtractor using logic gates. B) To realize Half Adder,Full adder, Half subtractor and Full subtractor using NAND gate.	**C272.1**
3.	Design and Analysis of Decoder	(A) To implement 2-to-4 Decoder and 3-to-8 Decoder using logic gates. (B) To implement Full adder using 3-to-8 Decoder.	**C272.1**
4.	Design and Analysis of Multiplexer	(A) To implement 2-to-1, 4 to 1, 8 to 1 multiplexer using logic gates. (B) To implement Full adder using 4 to 1 multiplexer.	**C272.1**
5.	Study and verification of Flip Flops	To Realize and verify the truth table of SR, JK, D and T flip flop.	**C272.1**
6.	Study and Analysis of Reconstruction Method of Signal	To Sample a given signal and reconstruct the signal from sampled waveform.	**C272.2, C272.3**
7.	Study and Analysis of Quantization process	To study the Quantization process of sinusoid signals.	**C272.3**
8.	Study and Analysis of	To study the binary phase shift keying and frequency shifting	**C272.3**

	Digital Modulation Technique	keying modulation process	
9.	Study and Analysis of Generation of Different Signal in time Domain	To generate the continuous- Time signals in the time domain and Discrete time signals in Time Domain.	**C272.3, C272.4**
10.	Study and Analysis of Generation of Different Signal in Frequency Domain	To generate discrete-Time Signals in the Frequency Domain.	**C272.3, C272.4**
11.	Study and Implementation of Digital Filter	To design Digital Filter.	**C272.3**

Evaluation Criteria

Components	**Maximum Marks**
Viva1	20
Viva2	20
Report file, Attendance, and D2D	60 (15+15+30)
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, "Digital Design," 3rd Edition, PHI, 2002
2.	A. V. Oppenheim, A. S. Willsky, "Signals and Systems," 2nd Edition, Pearson Education Limited, 2013
3.	A. A. Kumar, "Signals and Systems," 3rd Edition, PHI Learning Pvt. Limited, 2015
4	S. Haykin, M. Moher, "Introduction to Analog & Digital Communication," 2nd Edition, John Wiley & Sons, 2007

Detailed syllabus
Lecture-wise Breakup

Subject Code	15B1NHS432	**Semester:** ODD	**Semester** III **Session** 2018-2019 **Months:** from July 2018 to December 2018
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**
After pursuing the above mentioned course, the students will be able to:		
C206-6.1	Demonstrate a basic understanding of different perspectives and concepts of psychology	Understanding Level (C2)
C206-6.2	Apply the concepts of psychology in day to day life	Applying Level (C3)
C206-6.3	Examine the different theoretical perspectives and models of psychology	Analyzing Level (C4)
C206-6.4	Develop solutions for problems related to psychology using appropriate tools/models	Creating Level (C6)

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 number of Lectures			**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, 5th Ed., 2017

Detailed Syllabus
Lecture-wise Breakup

Course Code	16B1NHS332	**Semester : ODD (specify Odd/Even)**	**Semester** : III **Session** 2018 -2019 **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	*Demonstrate* the key concepts of different quantitative methods used in social sciences.	Understanding Level- (C2)
C206-3.2	*Classify and summarize the* data to be used for analysis.	Understanding 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+ 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	15B1NHS431	**Semester** : Odd	**Semester** III **Session** 2018 -2019 **Month** from July 2018 to Dec 2018
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	Analyze a literary text thematically and stylistically and examine it as representing different spectrum of life, human behaviour, and moral consciousness of society.	Analyse Level(C4)
C206-5.4	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	3
2.	Poems	On His Blindness: John Milton Ode to a Grecian Urn: John Keats My Last Duchess: Robert Browning Success is Counted Sweetest: Emily Dickinson A Prayer before Birth: Louis MacNeice Goodbye Party for Miss Pushpa T.S.: Nissim Ezekiel	7
3.	Prose & Short Stories	The Spectator Club: Richard Steele Ultima Thule: John Galsworthy Toba Tek Singh: Saadat Hasan Manto	6
4.	Plays & Drama	Select Soliloquies of Macbeth & Hamlet The Characters of Macbeth, Lady Macbeth & Hamlet as Universal Characters. The Caretaker: Harold Pinter	8
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 (Paper/Poster, Presentation , Oral Questions)
Total	**100**

Recommended Reading material:	
1	**M.H. Abrams**, *'A Glossary of Literary Terms'*, 7th Edition, Hienle & Hienle: Thomson Learning, USA, 1999
2	**Mark William Roche**, *'Why Literature matters in the 21st 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	**Harold Pinter**, *'The Caretaker: A Play in Three Acts'*, First Edition, Encore Publishing Co.,London, 1960
6	**Anon,** (n.d.). *The Spectator Club. Sir Richard Steele. 1909-14. English....* [online] Available at: http://www.bartleby.com/27/7.html [Accessed 2018].
7	*All poems online: http://www.poetryfoundation .org*
8	**Wolfgang Clemen**, '*Shakespeare's Soliloquies'*, First Edition, Routledge, London, 1987.

Detailed Syllabus
Lecture-wise Breakup

Course Code	**15B1NHS435**	**Semester III (specify Odd/Even)**	**Semester Session** 2018 - 2019 **Month from Jan-June 2019**
Course Name	Financial Accounting		
Credits	3	**Contact Hours**	3 (2,1,0)

Faculty (Names)	**Coordinator(s)**	Dr. Mukta Mani , Dr. Sakshi Varshney
	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	Meaning of Bank Reconciliation Statement, technique of	2

	Reconciliation Statement	preparing BRS, Causes of difference	
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

Course Code	**15B1NHS433**	**Semester** ODD **(specify Odd/Even)**	**Semester** III **Session** 2018 -2019 **Month from JULY-DEC**
Course Name	**INTRODUCTION TO SOCIOLOGY**		
Credits	**3**	**Contact Hours**	**2-1-0**

Faculty (Names)	**Coordinator(s)**	…
	Teacher(s) (Alphabetically)	…

COURSE OUTCOMES		**COGNITIVE LEVELS**
C206-7.1	Explain the major sociological perspectives and methods in the systematic study of society.	Remembering (C1)
C206-7.2	Develop and maximize the idea to explain processes of socialization, social control and how socialization operates in different societies and cultures and concepts of culture and its components (e.g., norms, values).	Understanding(C2)
C206-7.3	Explain the concept of social stratification and types of stratification as class, caste and gender.	Understanding (C2)
C206-7.4	Apply sociological perspective on the origin, development and characteristics of rural and urban societies.	Applying(C3)
C206-7.5	Analyse various social structures in societies and how it shapes and influences social interactions.	Analysing (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Introduction to sociology and the sociological imagination	2
2.	Basic Concepts of Sociology	Status, Roles, Communities, Interaction, Society and Groups Socialization, Culture, Social Stratification and Deviance	6
3.	Types of Communities	Caste(Sanskritization, Westernization,) ,Class & Tribes, Rural Societies Urban Structures	5
4.	Sociology of Institutions	Kinship, Family ,Religion, Education &Economy in Society	5
5.	Process of Change and Mobility	Modernization, Urbanization, Globalization, Liberalization and Knowledge and Power in Development	4
6.	Sociology of Science	Science, the Environment, and Technology	3
7.	Sociology of Collectivity	Collective Action, Social Movements, and Social Change	3
		Total number of Lectures	**28**

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.	Anthony Giddens, *Sociology*, 6th Edition, Wiley Publishers 2009
2.	C. Wright. And Mills, *The Sociological Imagination*, Oxford: Oxford University Press, 1959
3.	Peter Berger, *Invitation to Sociology: A Humanistic Perspective* (1963)
4.	Peter L Berger, *The Social Construction of Reality: a Treatise in the Sociology of Knowledge. Garden City,* New York: Anchor. (1966).
5	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
6	Ballentine and Roberts, *Our Social World: Introduction to Sociology*, 4th Edition, Sage. 2013
7	Robert Parkin and Linda Stone, (ed.). *Kinship and Family: An Anthropological Reader*, U.S.A.: Blackwell, 2000, selected chapters

Detailed Syllabus

Lecture-wise Breakup

Course Code	16B1NHS333	**Semester :** Odd	**Semester III Session** 2018 -2019 **Month from** July 2018 to Dec 2018
Course Name	Ethics and Corporate Governance		
Credits	3	**Contact Hours**	2-1-0

Faculty (Names)	**Coordinator(s)**	Dr. Monica Chaudhary(JIIT-62), Dr. Amba Agarwal (JIIT-128)
	Teacher(s) (Alphabetically)	Dr. Amba Agarwal, Dr. Monica Chaudhary

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C206-4.1	Apply the basic principle and theories of ethics in different contexts.	Applying Level (C3)
C206-4.2	Understand the various elements of Corporate Governance Structure, Principles and Functions.	Understanding Level (C2)
C206-4.3	Analyze perspectives of different stakeholders on ethical issues	Analyzing Level (C4)
C206-4.4	Illustrate the evolution and development of Corporate Governance in India and globally.	Understanding Level (C2)
C206-4.5	Evaluate the Corporate Governance failures through real life cases.	Evaluating Level (C5)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Introduction	Ethics, Business Ethics, Corporate Governance, Governance through Inner Consciousness and Sustainability. The Role and Responsibility of Business in Society.	4
2.	Ethical Principles in Business	Corporate Governance Structure, Corporate Governance Principles, Corporate Governance Functions, Failure of Governance and its Consequences.	4
3.	Conceptual Framework of Corporate Governance	Introduction, Need and Scope of Corporate Governance in India. Developments in Corporate Governance – A Global Perspective, Elements of Good Corporate Governance.	4
4.	Board of Directors	Role of Board of Directors. Organization Climate & Structure and Ethics. Addressing Ethical Dilemmas. Code of Ethics; Ethics Committee. Case Studies and Contemporary Developments.	4
5.	Board Effectiveness - Issues and Challenges	Board Composition; Diversity in Board Room; Types of Directors; Board's Role and Responsibilities. Relationship between Directors and Executives. Visionary Leadership. Performance Evaluation of Board and Directors.	4
6.	Board Committees	Various Board Committees, their Composition, Role, Responsibilities and Contribution. Audit Committee. Shareholders Grievance Committee. Remuneration	3

		Committee. Nomination Committee. Corporate Governance Committee. Corporate Compliance Committee & Other Committees.	
7.	Legislative Framework of Corporate Governance – An International Perspective	Australia, Singapore, South Africa, United Kingdom, Contemporary Developments in the Global Arena.	3
8.	Corporate Governance and Other Stakeholders	Employees, Customers, Lenders, Vendors, Government and Society.	2
		Total number of Lectures	**28**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25 (Presentation & Viva)
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.	Zabihollah Rezaee, Corporate Governance and Ethics, First Edition, Wiley, 2008.
2.	Robert A. G. Monks, Nell Minow, Corporate Governance, Fifth Edition, Wiley, 2011.

Detailed Syllabus
Lecture-wise Breakup

Course Code	**18B12HS411**	**Semester :ODD (specify Odd/Even)**	**Semester III Session** Month from July -December
Course Name	**Political Processes in India**		
Credits	**3** …	**Contact Hours**	2-1-0

Faculty (Names)	**Coordinator(s)**	…
	Teacher(s) (Alphabetically)	…

CO Codes	**COURSE OUTCOMES**	**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C206-2.1	Explain importance of Constitution and the formation of democratic rights of individual in Indian.	Understanding (C2)
C206-2.2	Understand different modes of political process to understand political system.	Understanding (C2)
C206-2.3	Interpret the working of the constitution	Understanding (C2)
C206-2.4	Explain the institutional formation	Understanding (C2)
C206-2.5	Examine which concepts are most useful for political processes of the country	Analysing (C4)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	**Political Parties and the Party System**	National and regional parties. Trends in the party system From the Congress system to the era of multiparty coalitions. The nature of, and challenges to, the electoral system social determinants of voting.	6
2.	**Federalism Regional Aspirations**	Politics of secession, autonomy and accommodation. Centre - state relations; Regionalism Ethnicity Globalizations.	6
3.	**Caste and Politics**	Caste in politics and the politicization of caste. Interaction of caste with class and gender. Caste discrimination and affirmative action policies	4
4.	**Institution Building**	Parliament (Committees and Sub Committees) Election Commission CAG National Human rights commission. The Supreme Court.	12

		Executive's – All India Services	
		Total number of Lectures	**28**

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.	Arora, B. (2000) 'Negotiating Differences: Federal Coalitions and National Cohesion', in Frankel, F. Hasan, Z. Bhargava, R. and Arora, B. (eds.) *Transforming India: Social and Political Dynamics of Democracy*. New Delhi: Oxford University Press
2.	Jaffrelot, C. (2001) 'The Sangh Parivar Between Sanskritization and Social Engineering', in Hansen, T.B. and Jaffrelot, C. (eds.) *The BJP and the Compulsions of Politics in India.* New Delhi: Oxford University Press
3.	Kothari, R. (2004). 'The Congress "System" in India', in Hasan, Z. (ed.) *Parties and Party Politics in India*, New Delhi: Oxford University Press
4.	Manor, J. 'Regional Parties in Federal Systems', in Arora, B. and Verney, D.V. (eds.) *Multiple Identities in a Single State: Indian Federalism in Comparative Perspective.* Delhi: Konark
5.	Shankar, B.L. & Rodrigues,V. (2005) *The Indian Parliament: A Democracy at Work*, New Delhi: Oxford University Press
6.	Manor, J. (1994) 'The Prime Minister and the President', in B.D. Dua, and J. Manor (eds.) *Nehru to the Nineties : The Changing Office of the Prime Minister in India*, Vancouver: University of British Columbia Press

Detailed Syllabus
Lecture-wise Breakup

Course Code	**16B1NHS331**	**Semester** Even **(specify Odd/Even)**	**Semester** 3 **Session** 2018 -2019 **Month from** July 2018 to Dec 2018
Course Name	Social and Legal Issues		
Credits	3	**Contact Hours**	**2-1-0**

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

CO Code	COURSE OUTCOMES	COGNITIVE LEVELS
C206-1.1	Demonstrate an understanding of social science and business law to individuals and businesses.	Understanding Level (C2)
C206-1.2	Critically evaluate how information technology, contractual agreements, rights and obligations affects business and society	Evaluating Level (C5)
C206-1.3	Analyse legal implications of societal laws.	Analyzing Level (C4)
C206-1.4	Develop acceptable attitudes with respect to ethical cultural and social issues related to technology, system, information	Applying Level (C3)

Module No.	Title of the Module	Topics in the Module	No. of Lectures for the module
1.	Introduction	Introduction to Social and Legal Issues	1
2.	Social Structure and Impact	Social Structure Social Impact on Information system and Technology Corporate Social Responsibility	3
3.	Ethics	Business Ethics & Values, Professional Conduct, Code of ethics for an Engineer, Ethics in Bio-Tech.	2
4.	Societal Laws	Introduction to Constitution, Right to information, Consumer Protection Act,	6
5.	Business Laws	Contract Act, Company Act, Negotiable Instruments Acts	8
6.	Intellectual Property & Cyberspace	Intellectual Property Issues:(What is Intellectual Property , Copyright Law, Trademark and Law of Patent	5
7.	Cyber Crime, Laws and IT Act	Computer Crimes(Fraud and Embezzlement, Sabotage & Information Theft, Intruders, Hacking& Cracking), Computer Crime Laws, Digital Forgery, Cyber Terrorism, Wiretapping, IT Act	3
		Total number of Lectures	**28**

Evaluation Criteria

Components	**Maximum Marks**
T1	20

T2	20
End Semester Examination	35
TA	25 (Assignment and Oral Viva)
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.	Albuquerque D, Business Ethics Principles and Practices, 1st edition, Oxford University Press,2010
2.	Baase,S, A Gift Of Fire Social, Legal, & Ethical Issues in Computing and Internet,2nd edition Prentice Hall, US, 2006
3.	Diwan,P. & Kapoor,S, Cyber And E-Commerce Laws with information Technology Act, & Rules,2nd edition, Prakesh Publication House,Jaipur , 2000
4	Gogna,P.P.S., A Text book of Business Law, 1st ed, , S Chand & Company LTD.2000
5	Ghosh,B., Ethics in Management and Indian Ethos, 2nd Edition, Vikas Publishing house,New Delhi, 2006

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11MA301	**Semester** Even	**Semester** III **Session** 2018 -2019 **Month from** July 2018 to Dec 2018
Course Name	Probability and Random Processes		
Credits	4	**Contact Hours**	3-1-0
Faculty (Names)	**Coordinator(s)**	Prof. B.P. Chamola, Dr.Pinkey Chauhan	
	Teacher(s) (Alphabetically)	Dr. Amit Srivastava, Prof. B.P. Chamola, Dr.Himanshu Agarwal, Dr. Lakhveer Kaur, Dr. Lokendra Kumar, Dr. Neha Singhal, Dr. Pankaj Srivastava, Dr.Pinkey Chauhan, Dr. Priyanka Sangal, Dr.Puneet Rana, Dr.Yogesh Gupta	

COURSE OUTCOMES:		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C201.1	explain the basic concepts of probability, conditional probability and Bayes' theorem	Understanding Level (C2)
C201.2	identify and explain one and two dimensional random variables along with their distributions and statistical averages	Applying Level (C3)
C201.3	apply some probability distributions to various discrete and continuous problems.	Applying Level (C3)
C201.4	solve the problems related to the component and system reliabilities.	Applying Level (C3)
C201.5	identify the random processes and compute their averages.	Applying Level (C3)
C201.6	solve the problems on Ergodic process, Poisson process and Markov chain.	Applying 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	7

		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.	
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**

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, Tata McGraw-Hill, 2002.
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	15B11MA302	**Semester :Odd**	**Semester: III, Session: 2018-2019** **Month: July to December**
Course Name	Probability and Statistics		
Credits	4	**Contact Hours**	3-1-0
Faculty (Names)	**Coordinator(s)**	Dr. Sudhakar Chaudhary	
	Teacher(s) (Alphabetically)	Dr. Sudhakar Chaudhary	

COURSE OUTCOMES		**COGNITIVE LEVELS**
After pursuing the above mentioned course, the students will be able to:		
C202.1	demonstrate different diagrammatic representation of data and explain the measures of central tendency, dispersion and asymmetry.	Understanding Level (C2)
C202.2	explain the concepts of probability theory and Bayes' theorem.	Understanding Level (C2)
C202.3	explain and solve the problems of probability distributions along with their mean, variance & moment generating functions.	Applying Level (C3)
C202.4	explain sampling theory and apply test of hypothesis on small and large samples.	Applying Level (C3)
C202.5	apply the method of least squares for curve fitting and explain correlation and regression.	Applying Level (C3)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Classification of Data	Classification of data, graphic and diagrammatic representation of data, measures of central tendency and dispersion i.e. mean and standard deviation, measures of skew ness and kurtosis.	6
2.	Probability	Sample space and events, Permutations and combinations, Probability of an event, Axioms of probability, Equiprobable spaces, Conditional probability, Multiplication and addition theorems, Bayes' theorem, Independent events.	10
3.	Random Variables	Random Variable, Discrete and continuous distributions, Mean and variance of a random variable	4
4.	Probability Distributions	Binomial, Uniform, Normal and Poisson distributions.	8
5.	Sampling Theory	Test of hypothesis and significance. Test based on Exact (Small) Sampling- Chi-square test, t test and F test.	10
6.	Correlation and Regression	Curve fitting by the method of least squares, Correlation and regression.	4
		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**
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.	**Walpole, R.E, Myers, R.H., Myers S.I and Ye. K**., Probability and Statistics for Engineers and Scientists, 8th Ed., Pearson, 2007
2.	**Papoulis, A. & Pillai, S.U.**, Probability, Random Variables and Stochastic Processes, Tata McGraw-Hill, 2002.
3.	**Spiegel, M.R.,** Statistics (Schaum's oulines), McGraw-Hill, 1995
4.	**Veerarajan, T.,** Probability, Statistics and Random Processes, Tata McGraw-Hill, 2002.
5.	**Johnson, R.A.**, Miller and Freund's Probability and Statistics for Engineers, 8th Ed., PHI Learning Private limited, 2011
6.	**Palaniammal, S.,** Probability and Random Processes, PHI Learning Private limited, 2012

Detailed Syllabus
Lecture-wise Breakup

Course Code	15B11EC314	**Semester - Odd**	**Semester 3, Session 2018-2019 Months July to Dec 2018**
Course Name	Introduction To Digital Systems		
Credits	**4**	**Contact Hours**	4

Faculty (Names)	**Coordinator(s)**	3. Satyendra Kumar(CCC) 4. Ankur Bhardwaj
	Teacher(s) (Alphabetically)	Ankur Bhardwaj, Ekta Goel, Saurabh Chaturvedi, Sumegha Yadav Dr. Kaushal Nigam, Dr. Gopal Rawat and Dr. Parul Arora

COURSE OUTCOMES		**COGNITIVE LEVELS**
C211.1	familiarize with the fundamentals of number system, Boolean algebra and Boolean minimization techniques.	Applying (Level III)
C211.2	analyze and design combinational circuits using logic gates.	Analyzing (Level IV)
C211.3	analyze state diagram and design sequential logic circuits using flip flops.	Analyzing(Level IV)
C211.4	understand the classification of signals & systems and learn basic signal operations & Fourier analysis.	Analyzing(Level IV)
C211.5	understand various steps involved in digitization and transmission of a signal.	Understanding(Level II)

Module No.	**Title of the Module**	**Topics in the Module**	**No. of Lectures for the module**
1.	Minimization Techniques and Combinational Circuits	Number system, 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	8
4.	Signals and systems	Signals and classification of signals: Continuous time and discrete time, Even and odd, periodic and non-periodic , Energy and Power signals, Basic signals - unit impulse, unit step and unit ramp. Basic operations of signals: time-scaling, time- shifting, etc. Systems and classification of systems: cont 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.	5

		Discrete Fourier Transform(DFT), properties and DFT standard signal pairs.	
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 modulaor and demodulator. DPCM, Linear DM and basics of ADM. Line coding formats- UNRZ, URZ, BNRZ, BRZ, AMI-NRZ, AMI-RZ and Manchester.	6
		Total number of Lectures	**42**

Evaluation Criteria

Components	**Maximum Marks**
T1	20
T2	20
End Semester Examination	35
TA	25(10 – attendance,10 - Quiz/Assignment/tutorial,5 -Class performance)
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.	Salivahanan, S., and S. Arivazhagan. *Digital circuits and design*. Vikas publishing house PVT Limited.
2.	Oppenheim, Alan V., Alan S. Willsky, and Syed Hamid Nawab. "Signals and Systems," *Prentice-Hall Englewood Cliffs*
3.	S. Haykin *Digital Communications* John Wiley & Sons, 2001
4.	H. Taub & D. L. Schilling, *Principles of Communication Systems*, 2nd edition, McGraw-Hill Higher Education.

Detailed Syllabus
Lab-wise Breakup

Course Code	15B17EC374	**Semester- Odd (specify Odd/Even)**	**Semester** III **Session** 2018 -2019 **Month from:** July 2018 to Dec. 2018
Course Name	DIGITAL SYSTEMS LAB		
Credits	2	**Contact Hours**	2 Hrs/Week

Faculty (Names)	**Coordinator(s)**	Kaushal Nigam, Saurabh Chaturvedi
	Teacher(s) (Alphabetically)	Satyendra Kumar, Gopal Rawat, Parul Arora

COURSE OUTCOMES		**COGNITIVE LEVELS**
C272.1	Recall the concepts of basic digital electronic circuits, such as logic gates and combinational circuits and Sequential Circuits	Remembering (Level I)
C272.2	Understand the MATLAB programming language and computing environment	Understanding(Level II)
C272.3	Apply the theory of digital electronics, signals and systems, digital signal processing and digital communication and write MATLAB programs	Applying (Level III)
C272.4	Analyze various digital circuits and systems, model them using MATLAB language and examine their simulation responses	Analysing (Level IV)

Module No.	**Title of the Module**	**List of Experiments**	**CO**
1.	Study of logic gates and verification of Boolean Laws	To verify the truth table of basic logic gates AND, OR, NOT, NAND, NOR, XOR, XNOR and their realization using universal logic gates.	**C**272.1
2.	Design and Implementation of Adders and Subtractors	A) To realize Half adder, Full adder, Half Subtractor and Full Subtractor using logic gates. B) To realize Half Adder,Full adder, Half subtractor and Full subtractor using NAND gate.	**C272.1**
3.	Design and Analysis of Decoder	(A) To implement 2-to-4 Decoder and 3-to-8 Decoder using logic gates. (B) To implement Full adder using 3-to-8 Decoder.	**C272.1**
4.	Design and Analysis of Multiplexer	(A) To implement 2-to-1, 4 to 1, 8 to 1 multiplexer using logic gates. (B) To implement Full adder using 4 to 1 multiplexer.	**C272.1**
5.	Study and verification of Flip Flops	To Realize and verify the truth table of SR, JK, D and T flip flop.	**C272.1**
6.	Study and Analysis of Reconstruction Method of Signal	To Sample a given signal and reconstruct the signal from sampled waveform.	**C272.2, C272.3**
7.	Study and Analysis of Quantization process	To study the Quantization process of sinusoid signals.	**C272.3**
8.	Study and Analysis of	To study the binary phase shift keying and frequency shifting	**C272.3**

	Digital Modulation Technique	keying modulation process	
9.	Study and Analysis of Generation of Different Signal in time Domain	To generate the continuous- Time signals in the time domain and Discrete time signals in Time Domain.	**C272.3, C272.4**
10.	Study and Analysis of Generation of Different Signal in Frequency Domain	To generate discrete-Time Signals in the Frequency Domain.	**C272.3, C272.4**
11.	Study and Implementation of Digital Filter	To design Digital Filter.	**C272.3**

Evaluation Criteria

Components	**Maximum Marks**
Viva1	20
Viva2	20
Report file, Attendance, and D2D	60 (15+15+30)
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, "Digital Design," 3rd Edition, PHI, 2002
2.	A. V. Oppenheim, A. S. Willsky, "Signals and Systems," 2nd Edition, Pearson Education Limited, 2013
3.	A. A. Kumar, "Signals and Systems," 3rd Edition, PHI Learning Pvt. Limited, 2015
4	S. Haykin, M. Moher, "Introduction to Analog & Digital Communication," 2nd Edition, John Wiley & Sons, 2007