GENERAL GUIDELINES

Do's:-

- Students should be on time for every lecture.

- Students are advised to show due respect to all faculty members.

- Students should keep the Classrooms, Laboratories and Workshops clean and tidy.

- Students must maintain absolute discipline and decorum, while on campus.

- **Students should come prepared with algorithm / flowchart / program / procedure for all the experiments before attending the laboratory session.**

- Students should bring the data sheets and laboratory records completed in all respects to the laboratory.

- Students are advised to clarify their doubts in the respective courses with the faculty.

- Students have to inform their parents that they should follow up the progress of their wards by being in touch with the institution authorities at regular intervals.

- **Students are advised to be present for the mentor meetings conducted by their respective Faculty Advisors, failing which appropriate disciplinary action will be taken.**

Don'ts:-

- Students are not permitted to attend the class without the identity card, once issued.

- **Ragging is strictly prohibited because it is punishable under Karnataka Education Act. Any student involved in ragging, will be severely punished – which includes handing over the case to Police, rustication from the college etc.**

- Writing on desks and walls is strictly prohibited, failing which the students will be fined heavily. If the identity of the individual is not established the entire class / students in the block will be fined.

- **Students must not use their cell phones during class hours. If any student is found using their cell phone during class hours it will be confiscated.**

- Students are not supposed to alter the configuration of the system / any software on the systems.

III SEMESTER (2016-2020)

Sl. No.	Course Code	Course Title	Hours per week				Credits	Course Type
			L	T	P	S		
1	UE16CS201	Digital Design & Computer Organization	4	0	0	0	4	FC
2	UE16CS202 *	Data Structures	4	0	0	0	4	CC
3	UE16CS203	Introduction to Data Science	4	0	0	0	4	FC
4	UE16CS204	Web Technologies 1	4	0	0	0	4	CC
5	UE16CS205	Discrete Mathematics and Logic	4	0	0	0	4	FC
6	UE16CS206	Digital Design & Computer Organization Laboratory	0	0	2	0	1	FC
7	UE16CS207	Data Structures Laboratory	0	0	2	0	1	CC
8	UE16CS208	Web Technologies 1 Laboratory	0	0	2	0	1	CC
9	UE17MA101D	Engineering Mathematics – I(Applicable to Lateral Entry Students)	2	1	0	0	2	FC
Total			20/22	0 /1	6	0	23 / 25	
Note: Prerequisite courses * UE16CS151								

Computer Science And Engineering
(Aug 17 – Dec 17)
UE16CS201: Digital Design and Computer Organization(4-0-0-0-4)

#of Hrs: 52

Class	Chapter Title/ Reference Literature	Topics To Be Covered	% Of Portions Covered	
			% of Syllabus	Cumulative %
1	**Unit #1**	Introduction, The map method		
2	**Gate-Level**	Four variable K-map		
3	**Minimization**	Product of Sums simplification		
4	**and**	Don't Care conditions		
5	**Combinational**	NAND and NOR implementation		
6	**logic-I**	Introduction, Combinational circuits	10	10
7	T1: 3.1-3.3 &	Analysis procedure		
8	3.5 -3.7,	Design Procedure,		
9	4.1 to 4.8	Binary adder-Subtractor		
10		Decimal Adder, Binary multiplier,Magnitude comparator		
11	**Unit #2**	Decoders		
12-13	**Combinational**	Encoders, Multiplexers		
14	**Logic-II** T1:4.9 to 4.11	Synchronous Sequential Logic: Introduction, Sequential circuits	8	18
15	**Synchronous**	Storage elements: Latches		
16-17	**Sequential**	Flip flops		
18	**Logic-I** T1: 5.1 to 5.5	Analysis of clocked sequential circuits		
19	**Unit #3**	State reduction and assignment		
20	**Synchronous**	Design procedure		
21	**Sequential Logic**	Registers and counters: Registers,		
22	**–II**	Shift register		
23	T1:5.7- 5.8 6.1-6.5	Ripple counters		
24-25		Synchronous counters	14	32
26		Other counters		
27	**Basic structure of computers** T2: 1.1 – 1.3, 2.1 – 2.7	Computer Types,FunctionalUnits:InputUnit,Memory Unit, ALU, Output Unit, Control Unit,Basic operational concepts		
28		Number representation and arithmetic Operations		
29		Character representation		

30		Memory locations and addresses, Memory Operations		
31		Instruction and instruction sequencing ,Addressing modes		
32		Assembly Languages,Basic I/O Operations		
33	**Unit #4** **Basic Processing Unit** T2:7.1-7.6	Some fundamental concepts, Execution of a complete instruction	8	40
34		Load Instructions, Arithmetic and Logic Instructions,		
35		Store Instructions; Execution of a complete instruction		
36		Multiple Bus Organization		
37		Hardwired control		
38-40		Data path control signals, Dealing with memory delay		
41	**Unit #5** **Arithmetic** T2: 6.2-6.7 **The Basic Input / Output** T2: 4.1- 4.2 & 4.4	Arithmetic: Fast adders, fast multiplication	12	52
42		Integer division		
43-44		floating point number and operations		
45		Basic Input / Output: Accessing I/O Devices, I/O Device Interface		
46		Program Controlled I/O		
47-48		Interrupts: Enabling and disabling interrupts		
49		Handling Multiple devices		
50-52		Controlling I/O device behaviour		

Literature

Book Type	Code	Title & Author	Publication Information		
			Edition	Publisher	Year
Text Book	T1	Digital Design By M.Morris Mano & Michael D. Ciletti	5th	Pearson	2013
	T2	Computer Organization By Carl Hamacher, ZvonkoVranesic, SafwatZaky	5th	McGraw-Hill,	2013

Computer Science And Engineering
(Aug 17 – Dec 17)
UE16CS202:Data Structures(4-0-0-0-4)

# of Hrs:52

Class #	Chapter Title/Reference Literature	TopicsToBeCovered	%Of Portions Covered	
			% of Syllabus	Cumulative %
1	**Unit #1 –Introduction/Lists** T1:1,4.7,4.8,5, AppendixT2:3,4	Overviewofcourse,DataStructures	19	19
2		ProgrammingPractices, Pointers,Structures		
3		Recursion,Abstractdatatype		
4		ListDefinitionandOperations		
5		Linklistandarrayimplementations(Lab1)		
6		LinkListoperations–Insert,		
7		LinkListoperations–concatenate,merge		
8		LinkListoperations–reverseetc		
9		ListApplication:Polynomialarithmetic(Lab2)		
10		DLL– Definition,LinkedListImplementation,		
11	**Unit #2 DLL/Stacks/Queues** T1:3,12 T2:2,4	DLL– operations,Header/Trailer nodes	24	43
12		CircularList–Array,LLImplementation		
13		Multilist–ImplementationandApps(Lab3)		
14		Stack–DefinitionandArrayImplementation		
15		Stack–LinkedListImplementation		
16		Stack–Applications(postfixetc)		
17		Stack–Applications(expressioneval)(Lab4)		
18		Stack–parenthesesbalancingetc.		
19		Queue–Definitionand Operations		
20		Queue–LL/Arrayimplementation		
21		CircularQueues–Implementation (Lab5)		
22		DoubleendedQueue		
23	**Unit #3 PriorityQueue,Trees** T1:4.1-4.5 T2:5.1,5.2	PriorityQueue–Definition and Application	19	62
24		PriorityQueueImplementation(un)sorted		
25		Trees–		
26		BinaryTreesDefinitionandproperties		
27		BinaryTreeImplementation		
28		Binary Trees Recursivemethods/Traversals		
29		BinaryTreeApplications(Lab7)		
30		BuildingandEvaluatingbinaryExpression		
31		BST-Definition,Application		
32		BST–SearchandInsertOperations		
33		BST–DeleteOperation(Lab8)		
34		BSTandBalancedSearchTrees		

35	**Unit #4**	AVLTrees-Properties		
36	**SearchTrees,HeapTrees**	AVLTrees–Insert/Delete		
37		AVLTrees–Rotations(Lab9)		
38	T1:9.1,9.3,9.4	Heap Trees–Implementation		
39	T2:7.2	HeapTrees–Insert		
40		HeapTrees–Delete		
41		PriorityQueueusingHeap(Lab10)	19	81
42		ReviewofTrees		
43		B-Trees		
44		B-Trees		
45	**Unit #5**	HashTable(Lab11)		
46		HashFunction		
47	**B-Trees/HashTable**	CollisionHandling–SeparateChaining		
48	T1:8.6,10.3	CollisionHandling–Open Addressing	19	100
49		Built-		
50		Built-indata structuresfromlibrary		
51	T2:7.3,7.4	ComparisonofDataStructures		
52		CourseSummaryandConclusion		

Literature

BookType	Code	Title&Author	*PublicationInfo*		
			Edition	Publisher	Year
TextBook	T1	RobertKruse,C.L.Tondo, BruceLeungandShashiMogalla,*DataStructuresandProgramDesigninC,*SecondEdition,Pearson/PHI,2015	2	Pearson/PHI	2015
Reference	T2	Tanenbaum,Langsam,Augenstein*"DataStructuresUsingCandC++,* Pearson/PrenticeHall,2nd Edition,2015	2	Pearson/PrenticeH	2015

Note: Pre-requisite for "Data Structures"(UE16CS202) is that students should have cleared "Problem Solving with C" (UE16CS151)

UE16CS203: Introduction to Data Science (4-0-0-0-4)

# of Hrs: 52

Class #	Chapter Title/Reference Literature	Topics to be covered	% of Portion	
			% of syllabus	Cumulative %
1.	**Unit #1** **Introduction to Data Science and Visualizing data** T1: Chapter 1 1.2, 1.3; T2: Chapter 55.3	Introduction to Data Science: Motivating Examples and Scope.	19.23%	19.23%
2.		Data Visualization Concepts.		
3.		Data Characteristics.		
4.		Visualizing Data:Histogram.		
5.		Visualizing Data: Histogram (2).		
6.		Visualizing Data: one variable (line, bar, pie charts).		
7.		Visualizing Data: one variable (box plots).		
8.		Visualizing Data: two variables (scatter plots).		
9.	**Unit #2** **Random Variables and Probability Distributions** T1: Chapter 2 2.4 – 2.5, Chapter 4 4.1 – 4.8	Random Variables: Discrete.	26.92%	46.15%
10.		Random Variables: Continuous.		
11.		Functions of Random Variables.		
12.		Bernoulli/Binomial Distribution.		
13.		Poisson Distribution.		
14.		Other Discrete Distributions: Hyper geometric Distribution, Geometric Distribution.		
15.		Other Discrete Distributions: Negative Binomial Distribution.		
16.		Other Discrete Distributions: Multinomial Distribution.		
17.		The Normal Distribution.		
18.		The Normal Distribution (2).		
19.		Lognormal Distribution.		
20.		Other Discrete Distributions: Uniform Distribution, Exponential Distribution, Gamma distribution, Weibull Distribution,		
21.	**Unit #3** **Sampling and Estimation**	Sampling concepts.	19.23%	65.38%
22.		The Central Limit Theorem.		
23.		Point estimates for population mean and proportion.		
24.		Probability Plots.		
25.		Estimation:Confidence intervals for the population mean.		
26.		Confidence intervals for proportions.		
27.		Confidence intervals for Small Samples.		

28.	T1: Chapter 4 4.9 – 4.12; Chapter 5 5.1-5.5,5.7, 5.9	Confidence intervals for difference between population mean.		
29.		Confidence intervals for difference between proportions.		
30.		Confidence Intervals with Paired Data.		
31.		Using Simulation to Construct Confidence Intervals.		
32.	**Unit #4** **Hypothesis and Inference** T1: Chapter 6 6.1 – 6.7, 6.9–6.10, 6.12, 6.13	Hypothesis and Inference: P-values.	19.23 %	84.61%
33.		Large Sample Tests for a Population mean.		
34.		Drawing conclusions from the Results of Hypothesis testing.		
35.		Tests for a population proportion.		
36.		Small- Sample tests for a Population mean.		
37.		Large -Sample tests for Difference between two means.		
38.		Tests for the difference between two Proportions.		
39.		Small-Sample Tests for the difference between two means.		
40.		Distribution-Free Tests.		
41.		The Chi-square test.		
42.		Fixed level testing, Power of a Test.		
43.		Running A/B tests.		
44.	**Unit #5** **Simple Linear Regression. Getting and Analyzing Data. Working with Data** T1: Chapter 7 7.1 – 7.4; T2: Chapter 9, 10	Simple Linear Regression: Building the regression model : Correlation.	15.39 %	100%
45.		Least squares Line.		
46.		Predictions using regression models - Uncertainties in Regression Coefficients.		
47.		Checking Assumptions and transforming data.		
48.		Getting and AnalyzingData : Reading Files.		
49.		Scraping the web.		
50.		Working with data: Data Preprocessing (Cleaning, Munging, Manipulation, and Rescaling).		
51.		Dimensionality Reduction.		

Literature

Book Type	Code	Title & Author	Publication Information		
			Edition	Publisher	Year
Text Book	T1	Statistics for Engineers and Scientists, William Navidi.	3rd	McGraw Hill Education, India	2013
Text Book	T2	Data Science From Scratch, Joel Grus	1st	O'Reilly	2015

UE16CS204: Web Technologies- I (4-0-0-0-4)

# of Hrs: 52

Class #	Chapter Title/Reference Literature	Topics to be Covered	% of Portions Covered	
			% of syllabus	Cumulative %
1.	**Unit #1 Introduction; HTML; CSS;** T1 : Ch. 1 (Section 1-7), Ch. 2 (Section 1-9), Ch. 3 (Section 1-5, 10-13) OnlineResource :iFrames, Responsive Design	Introduction: Internet, WWW, Servers, Browsers	19	19
2.		Domain Name System, URLs MIME Http		
3.		Using the developer tools(Chrome)		
4.		Basic HTML: Text Markup, Images, Hypertext Links		
5.		Lists ,Tables , Forms,iFrames		
6.		HTML5: Semantic Tags and Other Input Types		
7.		CSS Introduction, Levels, Style Specification,		
8.		Selectors, Property-Value Forms , Positioning		
9.		Box Model, <span> and <div>, Conflict Resolution		
10.		Responsive Design: Setting Viewports & Media Queries		
11.	**Unit #2 JavaScript – I;** T1: Ch. 4(Section 1-9) T2: Ch. 16	Introduction to client side scripting, JavaScript Basics	19	38
12.		General Syntax – Primitives, Operation, Expressions		
13.		Screen Input & Keyboard Output		
14.		JavaScript Objects		
15.		Inheritance		
16.		Hoisting		
17.		Functions		
18.		JavaScript Objects: String, Math		
19.		JavaScript Objects: Date, Arrays		
20.		JavaScript Objects: Window, Document		
21.	**Unit #3 JavaScript – II; Advanced CSS** T1: Ch. 5, T2: Ch. 20, Online Resources	DOM – Introduction	19	57
22.		Creating DOM Elements		
23.		Accessing & Modifying DOM		
24.		Accessing & Modifying DOM		
25.		Events & Event Handlers		
26.		Events & Event Handlers		

27.		Event Bubbling		
28.		Mouse & Keyboard Events		
29.		Synthetic Events, JavaScript Cookies		
30.		CSS3		
31.	**Unit #4** **Apache; PHP** T1: Ch. 9 T2: Ch. 2, 7,10	Apache: httpd server, basics,	19	76
32.		Apache: configuration, debugging		
33.		PHP Basics		
34.		File Handling & System Calls		
35.		PHP Arrays & Functions		
36.		PHP Strings & Regular Expressions, File Handling & System Calls		
37.		Cookies & Sessions		
38.		Form Processing Using PHP		
39.		Accessing MySQL using PHP		
40.		Accessing MySQL using PHP		
41.	**Unit #5** **HTML 5;** **JQuery;Bootstrap** T2: Ch. 22 ,23, 24, 25 Online Resource:JQuery,Bootstrap	HTML5: Basics, Detection	24	100
42.		HTML5:Drag & Drop		
43.		HTML5: Creating & Accessing Canvas, Writing Text to Canvas, Drawing Lines		
44.		HTML5: Using Paths, Manipulating Images		
45.		HTML5: Audio and Video, Geolocation		
46.		HTML5: Local Storage		
47.		HTML5: Offline Browsing		
48.		HTML5:Web Workers		
49.		JQuery		
50.		JQuery		
51.		Bootstrap		
52.		Bootstrap		

Literature

Book Type	Code	Title & Author	Publication Information		
			Edition	Publisher	Year
Text Book	T1	Programming The World Wide Web, Robert W. Sebesta	7th	Pearson	2013
Text Book	T2	Learning PHP, MySQL, JavaScript, CSS & HTML5, Robin Nixon	3rd	O'Reilly	2014
Text Book	R1	HTML5 Up and Running, Mark Pilgrim	1st	O'Reilly	2012
Online Reference	R2	W3 Schools	www.w3schools.com		

UE16CS205: Discrete Mathematics and Logic (4-0-0-0-4)

# of Hrs: 52

Class #	Chapter Title/Reference Literature	Topics to be Covered	% of Portions Covered	
			% of syllabus	Cumulative %
1.	**Unit #1 Basic Counting Principles** T1 : Ch 5.1 – 5.5	Motivation for the course. Basic Counting Principles – Sum Rule and Product Rule	15.5	15.5
2.		The Pigeonhole Principle		
3.		Applications of the Pigeonhole Principle		
4.		Permutations		
5.		Combinations		
6.		The Binomial Theorem and the Multinomial theorem		
7.		Permutations with Repetition		
8.		Combinations with Repetition		
9.	**Unit #2 Logic** T1: Ch 1.1 – 1.8	Basic connectives and truth tables.	23	38.5
10.		Tautology and Contradiction		
11.		Logical Equivalence		
12.		The laws of logic		
13.		The laws of logic (continued)		
14.		Rules of Inference		
15.		Predicates and Quantifiers		
16.		Predicates and Quantifiers (continued)		
17.		Logical Equivalences involving Quantifiers		
18.		Nested Quantifiers		
19.		Combining Rules of Inference for Propositions and Quantified Statements		
20.		Introduction to Proofs		
21.	**Unit #3 Sets,Functionsand Relations** T1 : Ch 2.1 – 2.3 Ch 7.1, 7.3 – 7.6 Ch 11.1 – 11.3	Sets and Operations in Sets	23	61.5
22.		Functions, Composition and Inverse of Functions		
23.		Relations and Their Properties		
24.		Representing Relations		
25.		Closure of Relations		
26.		Equivalence Relations		
27.		Equivalence Classes and Partitions		
28.		Partial Orderings		

29.		Hasse Diagrams		
30.		Lattices		
31.		Introduction to Algebraic Structures		
32.		Algebraic Structures		

33.		Mathematical Induction		
34.	**Unit #4**	Strong Induction and Well-Ordering		
35.	**Induction, Recursion**	Recursive Definition		
36.	**and Recurrence**	Structural Induction	15.5	77
37.	**Relations**	Recursive Algorithms		
38.		Recursive Algorithms		
39.	T1: Ch 4.1 – 4.4	Recurrence Relations		
40.	Ch 6.1 – 6.2	Solving Recurrence Relations		
41.		Introduction to Graph Theory		
42.		Basic Terminologies – Directed & Undirected Graphs		
43.		Sub-graphs and Complements		
44.		Graph Isomorphism		
45.		Vertex Degree and Regular Graphs		
46.	**Unit #5**	Konigsberg Bridge Problem and Eulerian Graphs	23	100
47.	**Graph Theory**	Hamilton Graphs		
48.		Planar Graphs		
49.	T1: Ch 8.1 – 8.8	Detection of Planarity		
50.		Bipartite &Kuratowski's Graphs		
51.		Graph Coloring		
52.		Chromatic Number of Graphs		

Literature

Book Type	Code	Title & Author	Publication Information		
			Edition	Publisher	Year
Text Book	T1	Discrete Mathematics and its Applications, Kenneth H. Rosen	7th (Indian adaptation by Kamala Kritivasan)	Tata McGraw-Hill	2011
Reference Book	R1	Discrete and Combinatorial Mathematics: An Applied Introduction, Grimaldi, Ramana	5th	Pearson	2011
	R2	Graph Theory with Applications to Engineering and Computer Science, NarsinghDeo		Prentice-Hall of India	2004

UE16CS206:Digital Design & Computer Organization Laboratory (0-0-2-0-1)

Lab#	Program No	Title of the program/ Problem Statement
1	Program 1	Truth table verification of basic gates and realization of given Boolean expression.
2	Program 2	Implement Adder / Subtractorcircuit .
3	Program 3	Implement BCD adder.
4	Program 4	Implement encoder and decoder
5	Program 5	Implement Multiplexer and Demultiplexer
6	Program 6	Implement comparators
7	Program 7	Implement storage elements using flip flops and registers
8	Program 8	Implement basic control unit and I/O devices.
9	Program 9	Mini-Project
10	Program 10	Mini-Project
11	Program 11	Mini-Project
12	Program 12	Mini-Project
13		Final Assessment

Lab #	Acitivity	Description
1		Practice Lab
2	Program1	Write a program to performthefollowingoperationsusingaLinkedList a) Insertanelementatthebeginning b) Deletethespecifiedelementfromthelist. c) Displayelementsofthelist.
3	Program2	Writeaprogramtoperformthefollowingoperationsusing LinkedList a) Insertanelementataspecifiedposition. b) Deletetheelementattheendofthelist. c) Reversethenodesinthelist. d) Displayelementsofthelist.
4	Program3	Writeaprogramtoperformthefollowingoperationsusing DoublyLinkedList a) Insertanelementatthebeginning. b) Deletethespecifiedelementfromthelist.
	Program4	Writeaprogramtoperformthefollowingoperationsusing DoublyLinkedList a) Insertanelementataspecifiedposition. b) Deletetheelementattheendofthelist.
5	Program5	Createanarrayorlinkedlistimplementationof STACK. ProvidePUSH,PEEP(orTOP)andPOPmethods. Checkfor: a) Overflow b) Underflow exceptionsduringtheseoperations.
6	Program6	Covertagiveninfixexpressiontopostfixexpression.
	Program7	Writeaprogramtoperformmatchingofbrackets– parentheses,squareandflowerbrackets.
7	Program8	CreateanarrayorlinkedlistimplementationofQUEUE.ProvideENQUEUE,DEQUEUEandFRONTmethods.Checkfor: a) Overflow b) Underflow exceptionsduringtheseoperations.
8	Program9	ImplementacircularqueueCQUEUEandimplementENQUEUEandDEQUEUEfunctions
9	Program10	ImplementaPriorityQueueusingheapwith a) Insert. b) RemoveMinmethods.

10	Program11	ImplementaBinarySearchTreeandperformthefollowing: a) Insertanode. b) PreorderTraversal. c) PostorderTraversal. d) InorderTraversal.
	Program12	ImplementaBinarySearchTreeandperformthefollowing: a) Findtheminimumelementinthetree. b) Findthemaximumelementinthetree. c) Findthenumberofnodesinthetree. d) Findthenumberofinternalnodesinthetree.
11	Program13	Createhashtablesforagivenhashfunctionandretrievethequeryelement.Use: a) Openhashingtechnique. b) Closedhashingtechnique.

UE16CS208: Web Technology I Laboratory (0-0-2-0-1)

Lab #	Acitivity	Description
1	Instruction / Introduction class	Introduction to Lab Environment and Basic Instructions
2	Program 1	Example on Basic HTML tags
3	Program 2	Example on HTML Forms & CSS
4	Program 3	Examples on JavaScript: Dialogs and Control Structure
5	Program 4	Examples on JavaScript: Functions, Object, Arrays
6	Mini Project	Tasks related to layout and design
7	Program 5	Examples on JavaScript: DOM and event handling
8	Program 6	Examples on JavaScript: DOM and event handling
9	Program 7	Example on PHP
10	Mini Project	Tasks involving client side scripting
11	Mini Project	Tasks involving server side scripting
12	Program 8	Example on HTML5
13	Mini Project	Mini Project Final Evaluation