SRI KRISHNA COLLEGE OF TECHNOLOGY
(AN AUTONOMOUS INSTITUTION)
KOVAIPUDUR, COIMBATORE - 641042.
Affiliated to Anna University and Approved by AICTE
Accredited by NBA - AICTE and NAAC - UGC

SRI KRISHNA INSTITUTIONS COIMBATORE

DEPARTMENT OF INFORMATION TECHNOLOGY

Regulation 2018

Curriculum and Syllabus (Semester I to IV)

REG 2018

SEMESTER I							
S No.	Course Code	Course	L/T/P	Contact hrs/week	Credits	Ext/Int	Categor
THEORY							
1.	18MA101	Linear Algebra and Differential Calculus	3/1/0	4	4	60/40	BSC
THEORY CUM PRACTICAL							
2.	18EN012	Technical Communication Skills	2/0/2	4	3	40/60	HSMC
3.	18CH012	Engineering Chemistry	3/0/3	6	4.5	40/60	BSC
4.	18IT101	Programming in Python	3/0/3	6	4.5	40/60	PCC
LABORATORY COURSE							
5.	18MES01	Engineering Graphics	2/0/2	4	3	40/60	ESC
MANDATORY COURSE							
6.	18MC001	Mandatory Course I Induction Programme	3 Weeks				MC
		Total	13/1/10	24	19	600	

SEMESTER II							
S No.	Course Code	Course	L/T/P	Contact hrs/week	Credits	Ext/Int	Category
THEORY							
1.	18MA201	Integral Calculus And Complex Variables	3/1/0	4	4	60/40	BSC
2.	18EES12	Fundamentals of Electrical and Electronics Engineering	3/0/0	3	3	60/40	ESC
3.	18IT201	C Programming	3/0/0	3	3	60/40	ESC
4.	18IT202	Information Technology Essentials	3/0/0	3	3	60/40	PCC
THEORY CUM PRACTICAL							
5.	18PH012	Physics	3/0/3	6	4.5	40/60	BSC
LABORATORY COURSE							
6.	18IT203	C Programming Laboratory	0/0/3	3	1.5	40/60	ESC
7.	18MES02	Engineering Practices Laboratory	1/0/4	5	3	40/60	ESC
		TOTAL	16/1/10	27	22	700	

SEMESTER III							
S No.	Course Code	Course	L/T/P	Contact hrs/week	Credits	Ext/Int	Category
THEORY							
1.	18MAS02	Discrete Structures	3/1/0	4	4	60/40	BSC
2.	18IT301	Object Oriented Programming	3/0/0	3	3	60/40	ESC
3.	18CS301	Computer Architecture	3/0/0	3	3	60/40	PCC
4.	18CS302	Data Structures	3/0/0	3	3	60/40	PCC
THEORY CUM PRACTICAL							
5	18ECS11	Digital Principles and System Design	3/0/2	5	4	40/60	ESC
LABORATORY COURSE							
6.	18MGS01	Design Thinking	1/0/2	3	2	0/100	HSMC
7.	18IT302	Object Oriented Programming Laboratory	0/0/3	3	1.5	40/60	ESC
8.	18CS303	Data Structures Laboratory	0/0/3	3	1.5	40/60	PCC
MANDATORY COURSE							
9.	18MC002	Mandatory Course II Environmental Awareness	-	-	-	-	MC
		TOTAL	16/1/10	27	22	900	

SEMESTER IV							
S No.	Course Code	Course	L/T/P	Contact hrs/week	Credits	Ext/Int	Category
THEORY							
1	18MAS05	Probability and Statistics	3/1/0	4	4	60/40	BSC
2.	18ECS13	Digital and Mobile Communication	3/0/0	3	3	60/40	ESC
3.	18CS401	Database Management Systems	3/0/0	3	3	60/40	PCC
4.	18CS402	Design and Analysis of algorithms	3/0/0	3	3	60/40	PCC
5.	18CS403	Operating Systems	3/0/0	3	3	60/40	PCC
6.	18IT401	Software Engineering	3/0/0	3	3	60/40	PCC
LABORATORY COURSE							
7.	18CS404	Database Management Systems Laboratory	0/0/3	3	1.5	40/60	PCC
8.	18CS405	Algorithms Laboratory	0/0/3	3	1.5	40/60	PCC
9.	18CS406	Operating Systems Laboratory	0/0/3	3	1.5	40/60	PCC
MANDATORY COURSE							
10.	18MC003	Mandatory Course III Indian Constitution	-	-	-	-	MC
		TOTAL	**18/1/9**	**28**	**23.5**	**1000**	

SEMESTER V							
S No.	Course Code	Course	L/T/P	Contact hrs/week	Credits	Ext/Int	Category
THEORY							
1	18MAS10	Fourier Series and Computational Methods	3/1/0	4	4	60/40	BSC
2	18CS501	Computer Networks	3/0/0	3	3	60/40	PCC
3	18IT501	Computational Intelligence	3/0/0	3	3	60/40	PCC
4	18IT502	Design Patterns and Prototyping	3/0/0	3	3	60/40	PCC
5	18ITEXX	Professional Elective – I	3/0/0	3	3	60/40	PEC
6	18XXOXX	Open Elective-I	3/0/0	3	3	60/40	OEC
LABORATORY COURSE							
7	18CS503	Computer Networks Laboratory	0/0/3	3	1.5	40/60	PCC
8	18IT503	Computational IntelligenceLaboratory	0/0/3	3	1.5	40/60	PCC
9	18IT504	UML & Design Pattern Laboratory	0/0/3	3	1.5	40/60	PCC
MANDATORY COURSE							
10	18MC004	Mandatory Course IV Professional Ethics					MC
		TOTAL	**18/1/9**	**28**	**23.5**	**1000**	

SEMESTER VI							
S No.	Course Code	Course	L/T/P	Contact hrs/week	Credits	Ext/Int	Category
THEORY							
1	18CS056	Theory of Computation	3/0/0	3	3	60/40	PCC
2	18IT601	Information and Web Security	3/0/0	3	3	60/40	PCC
3	18IT602	Big Data Analytics	3/0/0	3	3	60/40	PCC
4	18ITEXX	Professional Elective-II	3/0/0	3	3	60/40	PEC
5	18XXOXX	Open Elective-II	3/0/0	3	3	60/40	OEC
THEORY CUM PRACTICAL							
6	18IT067	Internet of Things	3/0/2	5	4	40/60	PCC
LABORATORY COURSE							
7	18IT603	Big Data Analytics Laboratory	0/0/3	3	1.5	40/60	PCC
PROJECT							
8	18IT604	Mini Project	0/0/4	4	2	40/60	PROJ
		TOTAL	**18/0/9**	**27**	**22.5**	**800**	

SEMESTER VII							
S No.	Course Code	Course	L/T/P	Contact hrs/week	Credits	Ext/Int	Category
THEORY							
1	18MGS02	Corporate Management	3/0/0	3	3	60/40	HSMC
2	18IT701	Block Chain Technology	3/0/0	3	3	60/40	PCC
3	18ITEXX	Professional Elective-III	3/0/0	3	3	60/40	PEC
4	18ITEXX	Professional Elective-IV	3/0/0	3	3	60/40	PEC
5	18ITEXX	Professional Elective-V	3/0/0	3	3	60/40	PEC
THEORY CUM PRACTICAL							
6	18IT702	Cloud and Virtualization	3/0/2	5	4	40/60	PCC
		TOTAL	**18/0/2**	**20**	**19**	**600**	

SEMESTER VIII							
S No.	Course Code	Course	L/T/P	Contact hrs/week	Credits	Ext/Int	Category
1	18IT801	Project	0/0/24	24	12	40/60	PROJ
		TOTAL	**0/0/24**	**24**	**12**	**100**	

PROFESSIONAL ELECTIVE/ OPEN ELECTIVES (15 Credits + 6 Credits)

S. No	Course Code	Course Title	L/T/P	Contact Hrs/Wk	Credits	Category
PROFESSIONAL ELECTIVES						
Networking and Computing						
1.	18ITE01	Ethical Hacking	3/0/0	3	3	PEC
2.	18ITE02	Mobile Application Development	3/0/0	3	3	PEC
3.	18ITE03	Mobile Computing	3/0/0	3	3	PEC
4.	18ITE04	Service Oriented Architecture	3/0/0	3	3	PEC
5.	18ITE05	Software Defined networks	3/0/0	3	3	PEC
6.	18CSE01	Wireless Networks	3/0/0	3	3	PEC
7.	18CSE03	Distributed Systems	3/0/0	3	3	PEC
8.	18CSE04	Quantum Computing	3/0/0	3	3	PEC
9.	18CSE05	Soft Computing	3/0/0	3	3	PEC
10.	18CSE07	Edge and Fog Computing	3/0/0	3	3	PEC
11.	18CSS16	Principles of Compiler Design	3/0/0	3	3	PEC
12.	18ECS07	Digital System and Signal Processing	3/0/0	3	3	PEC
13.	18ECS08	Embedded Systems	3/0/0	3	3	PEC
Programming Languages , Multimedia and Software Engineering						
1.	18ITE06	R Programming	3/0/0	3	3	PEC
2.	18ITE07	Building Enterprise Applications	3/0/0	3	3	PEC
3.	18ITE08	Software Testing and Quality Assurance	3/0/0	3	3	PEC
4.	18CSE08	Advanced Java Programming	3/0/0	3	3	PEC
5.	18CSE09	C# and .Net framework	3/0/0	3	3	PEC
6.	18CSE10	Computer Graphics and Multimedia	3/0/0	3	3	PEC
7.	18CSE11	Image Processing and Pattern Recognition	3/0/0	3	3	PEC
8.	18CSE13	GPU Computing	3/0/0	3	3	PEC
Intelligent Systems						
1.	18ITE09	Data Visualization	3/0/0	3	3	PEC
2.	18ITE10	User Experience Design	3/0/0	3	3	PEC
3.	18ITE11	Advanced Computation Intelligence	3/0/0	3	3	PEC

4.	18ITE12	Game Theory and its Applications	3/0/0	3	3	PEC
5.	18ITE13	Business Intelligence	3/0/0	3	3	PEC
6.	18ITE14	Deep Learning	3/0/0	3	3	PEC
7.	18ITE15	Cognitive Science & Analytics	3/0/0	3	3	PEC
8.	18ITE16	Augmented and Virtual Reality	3/0/0	3	3	PEC
9.	18CSE15	Data Warehousing and Mining	3/0/0	3	3	PEC
OPEN ELECTIVES (offered to other branches)						
1.	18ITO01	Cyber Security and Ethical Hacking	3/0/0	3	3	OEC
2.	18ITO02	Fundamentals of Database Systems	3/0/0	3	3	OEC
3.	18ITO03	Mobile Application Development using	3/0/0	3	3	OEC
4.	18ITO04	Virtual Reality	3/0/0	3	3	OEC
5.	18ITO05	Cloud Computing Fundamentals	3/0/0	3	3	OEC

EMPLOYABILITY SKILLS

S No.	Course Code	Course	Credit	Ext/Int	Category
1	18IP001	Industrial Practice	1.5	0/100	ES

ADDITIONAL CREDIT COURSES

S.No	Course Code	Course Title
1.	18AC001	Business Communication
2.	18AC002	Life Skills
3.	18AC003	Language
4.	18AC004	Certification Courses
5.	18AC005	Industry Offered Credit Courses
6.	18AC006	SCI / Scopus Indexed Publications
7.	18AC007	Value Added Courses
8.	18AC008	Representation in National / International Level Hardware / Software Contests
9.	18AC009	Audit / Self-Study Courses

SCHEME OF CREDIT DISTRIBUTION – SUMMARY

S. No	Stream	Credits/Semester								Credits	%
		I	II	III	IV	V	VI	VII	VIII		
1.	Humanities (HSMC)	3		2				3		8	4.84
2.	Basic Sciences(BSC)	8.5	8.5	4	4	4				29	17.5
3.	Engineering Sciences(ESC)	3	10.5	8.5	3					25	15.1
4.	Professional Core(PCC)	4.5	3	7.5	16.5	13.5	14.5	7		66.5	40.3
5.	Professional Electives(PEC)					3	3	9		15	9.09
6.	Open Electives(OEC)					3	3			6	3.64
7.	Project Work(PROJ)						2		12	14	8.53
8.	Employability Skills									1.5	0.91
9.	Mandatory Course (MC)									Additional Credit	-
	Total	19	22	22	23.5	23.5	22.5	19	12	**165**	100

18MA101 **LINEAR ALGEBRA AND DIFFERENTIAL CALCULUS (COMMON TO ALL BRANCHES)** **3/1/0/4**

Nature of the Course : Theory Analytical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To develop the skill to use matrix algebra techniques, gain knowledge in using infinite series of approximations for solutions arising in mathematical modeling, familiarize with functions of several variables and to find the solution of ordinary differential equations that are needed by engineers for practical applications

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Analysis the convergence of the infinite sequence	[AN]
CO2	Express square matrix in the diagonal form and infinite series approximations	[U]
CO3	Apply the knowledge of differential equation and extreme values of the given functions to solve the engineering problems	[AP]

Course Contents:

Linear Algebra – Symmetric, Skew – symmetric, orthogonal matrices, Characteristic equation, Eigen values and eigenvectors of a real matrices and their properties (statement only), Cayley-Hamilton theorem (statement only), Verification and application to find inverse and powers of real matrices, Orthogonal transformation of a real symmetric matrix to diagonal form, Reduction of Quadratic form to canonical form by orthogonal reduction, Sequences And Series – Convergence of sequences and series, Tests of convergence of positive term series, Comparison test, D'Alembert's ratio test, Cauchy root test, Alternating Series; Leibnitz's test, Series of positive and negative terms, Absolute and conditional convergence, Calculus – Functions of several variables, Total derivatives, Differentiation of implicit functions, Jacobians, Taylor series expansion, Maxima and Minima, Method of Lagrangian multipliers, Ordinary differential equations, Second and Higher order linear differential equations with constant coefficients, Cauchy's and Legendre's linear differential equations, Method of variation of parameters, Application of Ordinary differential equations - Differential equations connected with electric circuits and Simple Harmonic motion (Differential equations and associated conditions need to be given)

Total Hours: 60

Text Books:

1. G.B.Thomas and R.L.Finney, Calculus and Analytic Geometry, 13thEdition,Pearson, Reprint,2014
2. Kreyszig. E, "Advanced Engineering Mathematics" Tenth Edition, John Wiley and Sons (Asia) Limited, Singapore 2014
3. Grewal. B.S, "Higher Engineering Mathematics", 43rd edition, Khanna Publications, Delhi, 2014

Reference Books:

1. Veerarajan. T, "Engineering Mathematics I", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2018
2. Glyn James, —Advanced Modern Engineering Mathematics, Pearson Education, 4th edition, 2012
3. N.P.Bali and Dr.ManishGoyal,"A Text book of Engineering Mathematics" 9th edition, Laxmi publications ltd, 2014

Online References:

1. https://www.coursera.org/learn/linearalgebra2
2. https://www.coursera.org/learn/differentiation-calculus
3. https://www.coursera.org/learn/single-variable-calculus
4. https://alison.com/courses/Algebra-Functions-Expressions-and-Equations

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment			End Semester Examination [60 marks]
		CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	
Remember	-	-	-	-	-
Understand	30 %	20 %	20 %	20 %	20 %
Apply	50 %	60 %	60 %	60 %	60 %
Analyze	20 %	20%	20%	20%	20%
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution, Part A : 20 %, Part B : 80 %

18EN012 **TECHNICAL COMMUNICATION SKILLS** 2/0/2/3

(Common to all I B.E/ B. Tech Programmes)

Nature of the Course : Theory Practical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To facilitate the learners to enhance LSRW and soft skills to prepare them for their placement and corporate environment

Course Outcomes:

Upon completion of the course, students shall have ability to

- CO1 Recall language skills for technical communitation [U]
- CO2 Understand and communicate effectively in personal and professional situation [AP]
- CO3 Apply technical writing skills to write letters, emails and prepare technical documents [AP]
- CO4 Apply soft skills in corporate environment [AP]

Course Contents:

Theory

Basics of English language - Importance of LSRW skills - Introducing others - Listening to short conversations or monologues - Listening to speeches / talks - Listening and responding - Identifying the information before listening - Longer listening tasks -Recognise functions -Speaking about giving directions / instruction - Talk about preferences-Agree and disagree - Giving opinions - Speaking practices by giving examples, reasons and extra information- Short talk on business topics- Reading short texts - Skimming and scanning - Comparing facts and figures - Reading and understanding specific information in a text - Reading for gist - Cloze reading - Identifying reasons and consequences through reading practices - Comprehension – Collocations - Writing formal letters (accepting and declining invitations) - Writing business letters (Placing an order and complaint letter) - Email writing – Memo - Circular - Agenda and Minutes of the Meeting - Job application Letter - Resume Writing - Paragraph Writing – Essay writing-Technical instructions and Recommendations- Jumbled sentences - Technical Definitions - Report Phrases - Report writing - Technical proposal - Transcoding (Bar Chart, Flow Chart) - Note Making- Parts of speech- Tenses - Subject-verb Agreement - Sentence Structures - Connectives - Modal verbs - Question formation - If Conditionals- Active and passive - Impersonal Passive voice - Vocabulary Building - Business Vocabulary - Word Formation - prefixes and suffixes - Synonyms, antonyms –, abbreviations and acronyms – Homophones and Homonyms- British and American words - Identifying Common Errors.

Practical

Listening Comprehension- Pronunciation, intonation, stress and rhythm- Conversations and dialogues- Formal presentation- Group discussion- Interview skills

Total Hours: 60

Text Books:

1. Practical English Usage. Michael Swan. OUP. 1995
2. Remedial English Grammar. F T Wood, Macmillan, 2007
3. English For Engineers. Dr Sumanth S. Vijay Nicole Imprints Private Limited. 2015

Reference Books:

1. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006
2. Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011
3. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
4. On Writing Well. William Zinsser. Harper Resource Book. 2001

Online References:

1. http://www.academiccourses.com/Courses/English/Business-English
2. https://steptest.in
3. https://www.coursera.org/specializations/business-english
4. https://www.cambridgeenglish.org/
5. Oxfordonlineenglish.com

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [40 marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [40 marks]
Remember	-	-	-	-	-
Understand	25%	40 %	40 %	40 %	40 %
Apply	75%	60 %	60 %	60 %	60 %
Analyze	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution , Part A : 20 %, Part B : 80 %

18CH012

ENGINEERING CHEMISTRY

(Common to all I B.E/ B. Tech Programmes)

3/0/3/4.5

Nature of the Course : Theory Practical
Pre requisite(s) :
Co-Requisite(s) : -

Course Objective:

To impart knowledge on the applications of various chemical process and techniques in engineering field.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1 Analyse the water treatment processes to meet the requirements of boiler feed water, potable water, mechanism of corrosion and its mitigation [AN]

CO2 Apply the principles and working of electrodes, energy sources and storage devices in engineering field [AP]

CO3 Apply the knowledge of polymers in various industrial products. [AP]

CO4 Understand the principle and working of analytical techniques [U]

Course Contents:

Theory

Water treatment, characteristics of water-hardness - types - estimation by EDTA method-Boiler feed water, requirements-disadvantages of hard water-Boiler descaling process -Domestic water treatment, disinfection methods (chlorination, Ozonation, UV treatment)-demineralization process–desalination- reverse osmosis Corrosion, types–mechanism of dry and wet corrosion-galvanic corrosion-differential aeration corrosion-protective coatings, electroplating of gold-electroless plating of nickel- Electrochemistry, Electrochemical cells-electrolytic cell-reversible and irreversible cells - Free energy and emf- cell potentials- Oxidation and reduction potentials - Nernst equation and applications- Electrodes, standard hydrogen electrode-saturated calomel electrode-glass electrode-pH measurement - Energy Sources, Nuclear energy- reactor-breeder reactor. Photovoltaic cells, Fuel cells - Storage Devices- Batteries- alkaline-Lead acid and nickel cadmium batteries - Polymer chemistry, monomers and polymers-classification of polymers-Polymerization-types-Mechanism of addition polymerization (free radical mechanism)- Plastics, classification-preparation, properties and uses of Nylon 6,6, Nylon 6, PVC, Bakelite and PET- Moulding methods, Compression moulding-Injection moulding and Blow moulding - Spectroscopic techniques, Beer Lambert's law, principle, instrumentation and applications of Electronic spectroscopy (UV-visible), Vibrational and rotational spectroscopy (IR) and Flame emission spectroscopy (FES)- Synthesis of a commonly used drug molecule-Asprin, p-nitroaniline from acetanilide

Practical

Analysis of hardness, alkalinity, chloride and dissolved oxygen content in water sample, estimation of acid by pH and conductometric method, estimation of Iron using spectrophotometer and potentiometer, testing of corrosion and electroplating

Total Hours: 90

Text Books:

1 Dara S.S, Umare S.S, "Engineering Chemistry", S. Chand & Company Ltd., New Delhi 2013
2 R.V.Gadag, A.NithyanandaShetty "Engineering Chemistry" 3rd edition PHI Learning Pvt Ltd.,2014
3 Fundamentals of Molecular Spectroscopy, by C. N. Banwell

Reference Books:

1 ShikhaAgarwal., "Engineering Chemistry and Applications", Cambridge University press, 2016
2 Liliya.,Bazylak.I., Gennady.E., Zaikov., Haghvi.A.K., "Polymers and Polymeric Composites" CRC Press,2014
3 Zaki Ahmad, Digby Macdonald, "Principles of Corrosion Engineering and Corrosion Control", Elsevier Science, 2nd Edition 2012
4 Perez, Nestor, "Electrochemistry and Corrosion Science", Springer, 2016
5 Ghazi A.Karim. "Fuels, Energy and the Environment", CRC Press, Taylor and Francis group, 2012

Online References:

1 http://www.analyticalinstruments.in/home/index.html
2 nptel.ac.in/courses/105104102/hardness.htm
3 www.springer.com › Home › Chemistry › Electrochemistry
4 www.corrosionsource.com/

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Practical Rubric based CIA [40 Marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [40 marks]
Remember	-	-	-	-	-
Understand	20%	30%	30%	30%	30%
Apply	30%	30%	30%	30%	30%
Analyze	50%	40%	40%	40%	40%
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution , Part A : 20 %, Part B : 80 %

18IT101 **PROGRAMMING IN PYTHON** **3/0/3/4.5**

Nature of the Course : Theory Programming
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To understand and execute python script using types and expressions, assignment semantics, data types such as lists and dictionaries and to perform read & write operations on files.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Attain knowledge in structure of problem solving techniques	[U]
CO2	Read, write, execute by hand simple Python programs	[AP]
CO3	Decompose a Python program into functions.	[AN]
CO4	Represent compound data using Python lists, tuples and dictionaries	[AN]
CO5	Read and write data from/to files in Python Programs	[AP]

Course Contents:

Algorithms: Building Blocks Of Algorithms (Statements, State, Control Flow, Functions), Notation (Pseudo Code, Flow Chart, Programming Language), Algorithmic Problem Solving, Simple Strategies For Developing Algorithms (Iteration, Recursion). Illustrative Problems: Find Minimum In A List, Insert a Card in a List of Sorted Cards, guess an Integer Number In A Range, Towers Of Hanoi. **Python:** Python Interpreter And Interactive Mode; Values And Types: int, float, boolean, string, and list; Variables, Expressions, Statements, Tuple Assignment, Precedence Of Operators, Comments; Modules And Functions, Function Definition And Use, Flow Of Execution, Parameters And Arguments; Illustrative Programs: Exchange The Values Of Two Variables, Circulate The Values Of N Variables, Distance Between Two Points. **Control flow, functions :**Conditionals: Boolean Values And Operators, Conditional (If), Alternative (If-Else), Chained Conditional (if-elif-else); Iteration: State, While, For, Break, Continue, Pass; Fruitful Functions: Return Values, Parameters, Local And Global Scope, Function Composition, Recursion; Strings: String Slices, Immutability, String Functions And Methods, String Module; Lists As Arrays. Illustrative Programs: Square Root, GCD, Exponentiation, Sum An Array Of Numbers, Linear Search, Binary Search. **Lists, files, modules, packages:** Lists: List Operations, List Slices, List Methods, List Loop, Mutability, Aliasing, Cloning Lists, List Parameters; Tuples: Tuple Assignment, Tuple As Return Value; Dictionaries: Operations And Methods; Advanced List Processing - List Comprehension; Illustrative Programs: Selection Sort, Insertion Sort, Merge Sort, Histogram. Files And Exception: Text Files, Reading And Writing Files, Format Operator; Command Line Arguments, Errors And Exceptions, Handling Exceptions, Modules, Packages; Illustrative Programs: Word Count, Copy File.

Lab Component:

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)

Total Hours: 75

Text Books:

1 Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)
2 Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python" – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Reference Books:

1 Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python:An Inter-disciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016.
2 Timothy A. Budd, "Exploring Python||", Mc-Graw Hill Education (India) Private Ltd.,, 2015.
3 John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press , 2013

Online References:

1 http://nptel.ac.in/courses/106106145/
2 https://www.codecademy.com/learn/learn-python
4 https://www.programiz.com/python-programming
5 https://www.fullstackpython.com/best-python-resources

Course Co-ordinator [Chairman BOS/IT]

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment			End Semester Examination [60 marks]
		CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	
Remember	-	-	-	-	-
Understand	30%	40%	20%	20%	20%
Apply	40%	60%	40%	40%	40%
Analyze	30%	-	40%	40%	40%
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution , Part A:20%, Part B : 80%

SRI KRISHNA COLLEGE OF TECHNOLOGY (GL 42) CONTROLLER OF EXAMINATIONS

Course Coordinator

Chairman - BOS/IT

18MES01 **ENGINEERING GRAPHICS** **2/0/2/3**

(Common to CIVIL, EEE, ECE, IT, CSE)

Nature of the Course : Practical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To provide practical exposure to visualization of an object and its projections manually and using CAD software.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Demonstrate the visualization and projections of objects	[U]
CO2	Sketch orthographic projections of the given components	[AP]
CO3	Construct projections of lines, planes and solids using drafting software	[AP]
CO4	Develop lateral surfaces of solids including prisms and pyramids	[AP]
CO5	Draw conic curves and special curves	[AP]

Course Contents:

Introduction to 2 D drafting using CAD software, Conic curves by eccentricity method – Ellipse – Parabola – Hyperbola, Special curves – Cycloid – Involute, Isometric to Orthographic projection, Projection of Lines – Line inclined to both planes by rotating line method, Projection of Plane surfaces – Planes inclined to one reference plane, Projection of Solids – Solids inclined to one reference plane, Development of Surfaces.

Total Hours: 60

Reference Books:

1 Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50th Edition, 2014.
2 K. V. Natarajan, "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, 2018.
3 Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2011.
4 Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2013.

Online References:

1 http://nptel.ac.in/courses/112102101/
2 www.solidworks.com

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Rubric based Continuous Assessment[60 marks]	End Semester Examination [40 marks]
Remember	-	-
Understand	30%	30%
Apply	70%	70%
Analyze	-	-
Evaluate	-	-
Create	-	-

18MA201 **INTEGRAL CALCULUS AND COMPLEX VARIABLES** **3/1/0/4**

(COMMON TO ALL BRANCHES)

Nature of the Course : Theory Analytical
Pre requisite(s) :18MA101- Linear Algebra and Differential Calculus
Co-Requisite(s) : -

Course Objective:

To enhance the students ability in applying integration techniques and complex variables for solving engineering problems in their respective disciplines.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Illustrate the concepts of integrals in computing Beta and Gamma functions	[U]
CO2	Apply the concepts of integration in solving engineering problems.	[AP]
CO3	Identify the derivatives of the complex valued functions to solve complex valued integrals.	[AP]
CO4	Examine vector-related quantities and evaluate integrals over two- and three-dimensional space	[AN]

Course Contents:

Integral Calculus-Definite integrals, evaluation of definite integrals using Bernoulli's formula, Beta and Gamma functions -Relation between Beta and Gamma Functions, evaluation of Integrals using Beta and Gamma Functions, Multiple integrals - Double integration in Cartesian coordinates, Area as double integral, Change the order of integration, Triple integration in Cartesian co-ordinates, Volume as triple integral, Vector Calculus -Vector differential operator, Gradient of a scalar point function, Directional derivatives, Divergence and Curl of a vector point function, irrotational and solenoidal vector fields, Simple problems, Integral theorems-Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (Statements only), Simple applications involving cubes and rectangular parallelepipeds, Complex Variable-Complex differentiation, Analytic Functions, Cauchy-Riemann equations (Statement only), Harmonic functions, Conjugate harmonic functions, Construction of analytic functions, Conformal mapping, Transformation- $w = c+z, cz, \frac{1}{z}$ and Bilinear transformation, Complex integration- Cauchy's Integral theorem (Statement only), Cauchy's Integral formula, Laurent's and Taylors series, Zeros and singularities, Residues – Cauchy's Residue theorem (Statement only), Contour integration-Evaluation of real integrals of the form $\int_0^{2\pi} f(\cos\theta, \sin\theta)\, d\theta$ and $\int_{-\infty}^{\infty} \frac{P(x)}{Q(x)} dx$.

Total Hours: 60

Text Books:

1 G.B.Thomas and R.L.Finney, Calculus and Analytic Geometry, 13thEdition, Pearson, Reprint, 2014
2 Kreyszig. E, "Advanced Engineering Mathematics" Tenth Edition, John Wiley and Sons (Asia) Limited, Singapore 2014
3 Grewal. B.S, "Higher Engineering Mathematics", 43rd edition, Khanna Publications, Delhi, 2014

Reference Books:

1 Veerarajan. T, "Engineering Mathematics II",Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2018
2 Glyn James, —Advanced Modern Engineering Mathematics, Pearson Education, 4th edition, 2012
3 N.P.Bali and Dr.ManishGoyal,"A Text book of Engineering Mathematics" 9th edition, Laxmi publications ltd, 2014
4 Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010

Online References:

1 https://nptel.ac.in/courses/122104017/28
2 https://www.coursera.org/learn/integration-calculus
3 https://ocw.mit.edu/courses/mathematics/18-02sc-multivariable-calculus-fall-2010/1
4 https://alison.com/courses/Advanced-Mathematics-1
5 https://www.edx.org/course/algebra-lineal-mexicox-acf-0903-1x
6 http://www.math.odu.edu/~jhh/counter10.html

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment			End Semester Examination [60 marks]
		CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	
Remember	-	-	-	-	-
Understand	10 %	20 %	10 %	10 %	10 %
Apply	70 %	80 %	70 %	70 %	70 %
Analyze	20 %	-	20 %	20 %	20 %
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution , Part A : 20 %, Part B : 80 %

18EES12 **FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING** **3/0/0/3**

(Common to CSE & IT)

Nature of the Course : Theory
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To enable the students to gain knowledge about the fundamentals of electrical and electronics engineering

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Understand the basic concepts of DC and AC circuits.	[U]
CO2	Apply the concepts of electromagnetic principle in DC machines.	[AP]
CO3	Understand the characteristics of PN junction diode and Zener diode	[U]
CO4	Understand the concept in digital systems	[U]
CO5	Understand the concept of power system.	[U]

Course Contents:

Basic Electric Circuits: Ohm's Law, Kirchhoff's Laws, Mesh current and node voltage method of analysis for D.C Circuits, Introduction to AC Circuits: Waveforms and RMS Value, Power and Power factor, Single Phase and Three Phase Balanced Circuits [Quantitative approach]. **Electrical Machines:** Basic principle, Construction, working, EMF equation, types and applications of DC generator and DC Motor. Transformer: Principle, construction, EMF equation and types [Qualitative approach]. **Basic Electronics**: Introduction of PN junction Diode, VI characteristics of PN Junction diode, Zener effect, Zener diode and its characteristics, half wave and full wave rectifiers [Qualitative approach]. **Digital Electronics:** Introduction to Binary Number System – Logic Gates – Boolean Algebra: De-Morgan's theorem [Quantitative approach]. **Introduction to Power System:** Structure of electric power systems, EHVAC transmission systems and EHVDC transmission systems Substation layout, Insulators- PIN, Suspension, Strain and shackle [Qualitative approach].

Total Hours: 45

Text Books:

1 Mittle V.N., "Basic Electrical Engineering", Tata McGraw Hill Edition, New Delhi,2009
2 Sedha R.S., "Applied Electronics" 2nd Edition ,S. Chand & Company Ltd, 2008

Reference Books:

1 Muthu Subramanian R, Salivahanan S and Muraleedharan K.A.,"Basic Electrical, Electronics and Computer Engineering", 2nd Edition, Tata McGraw Hill, 2009.
2 Nagsarkar T.K and Sukhija M S., "Basics of Electrical Engineering", Oxford press, 2012.
3 Mehta V. K,, "Principles of Electronics", S.Chand & Company Ltd, 2014.
4 Premkumar N., "Basic Electrical Engineering", Anuradha Publishers, 2014.
5 Wadhwa C.L., "Electrical Power Systems", Wiley eastern Ltd, India,2009.
6 Mehta V.K., and Rohit Mehta., "Principles of Power System", 3rd Edition, S.Chand and Company Ltd, 2006

Online References:

1 https://www.electrical4u.com/
2 http://nptel.ac.in/courses/108106069/
3 http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/power-system/ui/TOC.htm
4 Electricity & Magnetism, Part 1- PHYS 102.1x (edx.in)
5 https://www.coursera.org/learn/electronics

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	80 %	70 %	100%	70 %	70 %
Apply	20%	30 %	-	30 %	30 %
Analyze	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution , Part A : 20 %, Part B : 80 %

G.1. P. Pandiyan

18IT202 **INFORMATION TECHNOLOGY ESSENTIALS** **3/0/0/3**

Nature of the Course : Theory
Pre requisite(s) : -
Co-Requisite(s) : -
Course Objective:
To expertise the basics of Information Technology tools and technologies.

Course Outcomes:
Upon completion of the course, students shall have ability to

CO1	Attain the knowledge in computer hardware	[U]
CO2	Familiarize in various storage network technologies	[U]
CO3	Understand the different types of scripting languages	[U]
CO4	Design simple interactive web applications	[AP]

Course Contents:
Hardware Essentials - Processor Specifications - Processor manufacturing, BIOS Basics -Motherboard ROM BIOS-Upgrading the BIOS, Memory-Basics-Standards-Speed and Performance-Modules, Hard disk Drive(HDD),Solid State Drive (SSD),Motherboard Connectors, Storage Technologies - Direct attached storage-types-Benefits and Limitations-Disk drive interfaces, Storage Area Network-Evolution-Components, Network Attached Storage, General purpose servers-Benefits-Components, scripting essentials - Introduction to HTML , Need for Scripting languages , Types of scripting languages - Client side scripting - CSS – JavaScript, Server side scripting - PHP - Working principle of PHP - PHP Variables - Constants - Operators – Flow Control and Looping – Functions and Objects - Arrays – Strings – File Handling, web essentials, Introduction to Internet and World Wide Web, Web browsers, Web Servers – URL – DNS - Types of servers, Application Server - Web Server - Database Server, Authoring tools - Creating an interactive website

Total Hours: 45

Text Books:
1. Scott Mueller "Upgrading and Repairing PCs", 22 nd Edition, QUE, Pearson Education, New Delhi, 2015.
2. G Somasundaram, Alok Shrivastava, "Information Storage and Management", EMC Education services, Wiley India, 2009
3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5" Third Edition, O'REILLY, 2014.

Reference Books:
1. http://www.brainbell.com/tutors/A+/Hardware/Preventive_Maintenance.htm
2. https://alison.com/course/how-to-create-your-first-website
3. Govindaraju B. "IBM PC and Clones: Hardware, Trouble Shooting and Maintenance", 2nd Edition, Tata McGraw Hill Pub. Co., New Delhi, 2002
4. Robert W. Sebesta, "Programming the World Wide Web", Addison-Wesley,7th Edition, 2012.
5. UttamK.Roy, "Web Technologies", Oxford University Press, 1st Edition, 2011

Online References:
1. http://www.brainbell.com/tutors/A+/Hardware/Preventive_Maintenance.htm
2. https://alison.com/course/how-to-create-your-first-website
3. https://onlinecourses.nptel.ac.in/noc17_cs40/announcements
4. http://www.worldwidelearn.com/online-training/pc-hardware-courses.html
5. http://learnerstv.com/Free-Computer-Science-Video-lectures-ltv578-Page1.htm

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment			End Semester Examination [60 marks]
		CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	
Remember	-	-	-	-	-
Understand	60%	100%	60%	60%	60%
Apply	40%	-	40%	40%	40%
Analyze	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution, Part A : 20 %, Part B : 80 %

T. Alaf. [Chairman - BOS (IT)]
(Course Coordinator)

18PH012 **PHYSICS** 3/0/3/4.5

(Common to CSE & IT)

Nature of the Course : Theory Practical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To impart knowledge of physics in solving real time engineering problems

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Understand the fundamental concepts of interference, diffraction and polarization	[U]
CO2	Analyze the basics in magnetic and superconducting materials	[AN]
CO3	Analyze about the semiconductors and fibre optic communication	[AN]
CO4	Apply the gained knowledge to solve the problems related to their field of study	[AP]

Course Contents:

Theory

Wave optics, Interference-principle of superposition-young's experiment-Theory of interference fringes-types of interference - Michelson interferometer - Interference filter - Diffraction, Two kinds of diffraction-Difference between interference and diffraction-zone plate-Fraunhoffer diffraction at single slit-plane diffraction grating – Polarization, Introduction- Double refraction-Nicol's prism-Huygen's theory of double refraction - Magnetic and Superconducting materials, Definitions - origin of magnetic moment – Bohr magneton – para, dia, Ferro and anti-Ferro magnetic material – domain theory –energies involved in domain growth- magnetic hysteresis – soft and hard magnetic materials – Ferrites – properties - applications-Magnetic recording and readout-magnetic disc drives - Superconductors, Superconductivity -properties – temperature dependence of resistivity in superconducting materials – temperature dependence of critical field – critical currents- Meissner effect-Josephson effect - types of super conductors – BCS theory - High T_c super conductors – applications – SQUID, cryotron, magnetic levitation - Semiconductor devices and Fibre Optic Communication, Introduction to semiconductors- Open Circuited P-N junction Diode-Energy Diagram PN Diode- Working of Diode- VI Characteristics of P-N junction Diode –Light Emitting Diode(LED)- Liquid Crystal Display (LCD)-Transistor – Bi-polar Junction Transistor(BJT)- VI characteristics- Field Effect Transistor (FET)-VI characteristics - Fibre Optics, Principle and propagation–numerical aperture and acceptance angle – classification of optical fibers - splicing - fibre optic communication system (Block diagram) - PIN detector - Fibre optic sensors - temperature and displacement

Practical

Laser and optical fiber parameters, Wavelength of mercury spectrum, Coefficient of viscosity for a liquid, Young's modulus & Rigidity Modulus measurements, Air wedge – Thickness of thin sample, Magnetic field along the axis of current carrying coil, LCR & RC circuits, Frequency of tuning fork

Total Hours: 90

Text Books:

1 Beiser A, Concepts of Modern Physics, 5th Ed., McGraw Hill International, 2010
2 S L.Gupta, Sanjeev Gupta, Dhanpat Rai Publications "Modern Engineering Physics" 2011

Reference Books:

1 David Halliday, Robert Resnick, Jearl Walker "Fundamentals of Physics" Wileyplus.2010
2 University Physics-Sears & Zemansky (Addison-Wesley)
3 Ajoy Ghatak " Optics" 5th Ed., Tata McGraw Hill, 2012

Online References:

1 http://nptel.ac.in/courses/112104158/
2 https://physics.info/
3 https://ocw.mit.edu/courses/physics/8-04-quantum-physics-i-spring-2013/
4 https://www.corning.com/in/en/products/communication-networks/.../fiber.html

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Practical Rubric based CIA [40 Marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [40 marks]
Remember	-	-	-	-	-
Understand	10 %	30 %	30 %	30 %	30 %
Apply	40 %	40 %	40 %	40 %	40 %
Analyze	50 %	30 %	30 %	30 %	30 %
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution , Part A : 20 %, Part B : 80 %

18IT201 **C Programming** **3/0/0/3**

Nature of the Course : Theory Program
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To provide exposure to problem solving by learning the C programming constructs and memory management concepts

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1 Understand the fundamentals of C programming [U]
CO2 Apply decision making and looping strategies in problem solving [AP]
CO3 Implement programs using arrays and Modular programming [AP]
CO4 Develop programs by applying pointers to arrays, strings, structures and pointers to functions [AP]

Course Contents:

C Character Set, Identifiers and Keywords, Data Types, Constants Variables, Declarations, Operators and Expressions, Data input and output, Preparing and running a Complete C Program, Control Structures, if-if-else- nested if-else, while-do-while-for nested control structures, switch, break, continue, comma, goto, Arrays, Defining an array- Processing an array- Types of Array-Multi dimensional arrays, Strings, Defining a string-Null character-initialization of strings – reading and writing a string- String built in functions - processing the string, Functions, Defining a Function – Accessing a function – Function Prototypes-Recursion-Passing arrays to function, Structures, Defining a structure – Type Definition – processing a structure - Structures and functions, Union, Pointers, Pointers fundamentals – Pointer Declaration -Pointers to array - Pointer to functions - Pointer to function arguments - function return as pointer- Pointer to strings – Array of pointers –pointers to pointers-Dynamic memory allocation - Pointer to structures - Self -referential Structure-Bit Fields.

Total Hours: 45

Text Books:

1 Byron, S. Gottfreid, "Programming with C", Tata McGraw Hill, Schaum's outlines, 3rd Edition, 2014.
2 Kenneth A. Reek, "Pointers on C" , Pearson Education, First Edition, 2007.
3 Yashavant Kanetkar, "Understanding Pointer in C", 4th Edition, BPB Publication, 2017.

Reference Books:

1 Herbert Schildt, "The Complete Reference C", 4th edition, TMH,2015.
2 S.ThamaraiSelvi and R.Murugesan, "Programming in ANSI C", 6E, TMH, 2012.
3 K.R.Venugopal and SudeepR.Prasad , "Mastering C", TMH ,Second edition , 2015
4 E Balagurusamy, "Programming in ANSI C", 7th Edition, TMH, 2017.
5 YashwantKanetkar, "Let us C", 16th Edition, BPB Publications, 2018

Online References:

1 http://nptel.ac.in/courses/106105085/.
2 http://nptel.ac.in/courses/106106127/
3 http://students.iitk.ac.in/programmingclub/course/#notes
4 https://www.edx.org/course/c-programming-getting-started
5 https://www.coursera.org/specializations/c-programming
6 https://onlinecourses.nptel.ac.in/iitk_cs_101/preview

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment			
		CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	40%	40%	40%	30%	30%
Apply	60%	60%	60%	70%	70%
Analyze	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution, Part A : 20 %, Part B : 80 %

[Chairman-BOS IT]

(Course Coordinator)

18IT203 **C PROGRAMMING LABORATORY** **0/0/2/1.5**

Nature of the Course : Practical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To enhance their analyzing and problem solving skills and use the same for writing programs in C

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1 Understand the basic structure, trace the execution of programs and usage of operators. [U]
CO2 Apply decision making and looping in problem solving. [AP]
CO3 Make use of Arrays, strings in real world problems. [AP]

Course Contents:

Processing data types, formatting input and output,Evaluating Expressions, Decision making, Looping statements, Single and two dimensional arrays, String manipulation, Functions, Dynamic memory allocation, Structures- passing structure to function, Pointer to arrays, pointer to strings and pointer to function, Pointer to structure and self-referential structure.

Total Hours: 45

Reference Books:

1 Byron, S. Gottfreid, "Programming with C", Tata McGraw Hill, Schaum's outlines, 3rd Edition, 2014.
2 Kenneth A. Reek, "Pointers on C" , Pearson Education, First Edition, 2007.
3 Yashavant Kanetkar, "Understanding Pointer in C", 4th Edition, BPB Publication, 2017.
4 Herbert Schildt, "The Complete Reference C", 4th edition, TMH, 2015.

Online References:

1 https://www.edx.org/course/c-programming-getting-started
2 https://www.coursera.org/specializations/c-programming
3 https://onlinecourses.nptel.ac.in/iitk_cs_101/preview

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Rubric based Continuous Assessment[60 marks]	End Semester Examination [40 marks]
Remember	-	-
Understand	40	40
Apply	60	60
Analyze	-	-
Evaluate	-	-
Create	-	-

[Chairman-BOS IT]

(Course Coordinator)

18MES02

ENGINEERING PRACTICES LABORATORY
(Common to CIVIL, EEE, ECE, IT, CSE)

1/0/4/3

Nature of the Course : Practical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

1. To provide practical exposure to basic hand tools and gain hands on experience on Carpentry, Sheet metal, Plumbing, welding and Foundry.
2. To provide practical exposure to basic electrical devices, meters and electronics devices and meters and to gain knowledge about the fundamentals of various electrical and electronic gadgets, basic electronic instruments, their working and trouble shooting

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Identify and solve the basic engineering problems at home and in workplace	[AP]
CO2	Develop the surfaces and make simple components like tray, funnel etc.	[C]
CO3	Make simple metal joints using welding equipment and wooden joints using carpentry tools.	[AP]
CO4	Prepare pipe connections and sand moulds.	AP]
CO5	Demonstrate the fundamentals of machining.	[U]
CO6	Examine and troubleshoot electrical and electronics circuits	[A]

Course Contents:

Group A (Civil & Mechanical): Manufacturing Methods –Sheet metal operations - Welding - arc welding , gas welding , TIG & MIG welding –- basic machining using lathe - metal casting - Carpentry work using power tools - Plumbing components and pipelines

List of Experiments: Preparation of butt joints and lap joints using arc welding and TIG / MIG welding, Sheet metal Forming and Bending, Model making – Trays and funnels, Preparation of wooden joints by sawing, planning and cutting, Making basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings, Basic machining simple turning operations, Demonstration on foundry operations like mould preparation for solid and split piece pattern

Group B (Electrical And Electronics Engineering): Basic Circuit Elements: Resistor, inductor, capacitor. Introduction to measuring equipments: Moving iron meter, moving coil meter, Wattmeter, Energy meter, CRO, Multi-meter. Digital logic circuits, PCB design, fuse, relay, circuit breaker, wire, Earthing, fan, fluorescent lamp, iron box, mixer grinder.

List of Experiments: Study and identification of electronic components with specification, Testing of CRO and Electronic components using Multimeter, Generation and measurement of signals using CRO, Familiarisation of digital basic gate IC's, Soldering practice-components devices and circuits- using general purpose PCB, Demonstration of meters and electrical components, Safety precautions with electrical components, Residential house wiring.

Total Hours: 75

Reference Books:

1 Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology", Pearson Education, Inc. 2009 (Second Indian Reprint).
2 Hajra Choudhury, "Elements of Workshop Technology", Vol. I & II, Media Promotors Pvt Ltd., 2014.
3 Suyambazhagan S, 'Engineering practices' PHI Learning private limited, New Delhi, 2012.
4 D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
5 E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.

Online References:

1 www.nptel.ac.in
2 www.sme.org
3 http://www.allaboutcircuits.com/education/

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Rubric based Continuous Assessment[60 marks]	End Semester Examination [40 marks]
Remember	-	-
Understand	-	-
Apply	70%	70%
Analyze	30%	30%
Evaluate	-	-
Create	-	-

18MAS02 **DISCRETE STRUCTURES** **3/1/0/4**
(Common to CSE & IT)

Nature of the Course : Theory Analytical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective: To extend student's logical and mathematical maturity and ability to deal with abstraction, introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems. To familiarize the applications of algebraic structures. To develop the skills of the students to apply logics in programming and coding using group theory

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	To demonstrate the basic concepts of sets, groups, truth table and validity of arguments.	[U]
CO2	Build on the concepts of relation, mathematical function and all of its properties.	[AP]
CO3	Identify operator-algebraic techniques to reformulate and solve group theoretic problems.	[AP]
CO4	Analyze the concepts of Discrete Mathematics in software development and hardware design	[AN]

Course Contents:

Propositional calculus- Propositions, Logical connectives, Compound propositions, Conditional and bi-conditional propositions, Truth tables, Tautologies and contradictions, Contrapositive, Logical equivalences and implications , Normal forms – Principal conjunctive and disjunctive normal forms– Rules of inference, Arguments, Validity of arguments, Predicate calculus- Predicates , Statement function, Variables- Free and bound variables, Quantifiers, Universe of discourse, Logical equivalences and implications for quantified statements, Theory of inference, The rules of universal specification and generalization, Validity of arguments ,Set theory- Basic concepts , Subset, Algebra of sets , power set , Ordered pairs and Cartesian product, Relations on sets Types of relations and their properties, Relational matrix and the graph of a relation, Equivalence relations, Partial ordering, Poset, Hasse diagram, Functions- Definitions of functions , Classification of functions, Types of functions- Examples, Composition of functions, Inverse function, Binary and n-ary operations, Characteristic function of a set, Hashing functions, Recursive functions, Permutation functions, Group theory-Binary operation, Semi group, Monoid, Group, Subgroup, Abelian group, Group homomorphism and isomorphism, Normal subgroup, Quotient group, Lagrangian theorem, Coding theory ,Hamming distance, Group coding ,encoding and decoding.

Total Hours: 60

Text Books:

1 Tremblay J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011
2 Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", Sixth edition, Pearson Education pvt Ltd., New Delhi, 2014.
3 Veerarajan T, "Discrete Mathematics with Graph theory and Combinatorics", Tata McGraw – Hill Pub. Co. Ltd., New Delhi, seventh reprint ,2015

Reference Books:

1 Kenneth H.Rosen, "Discrete Mathematics and its Applications", Seventh Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2012
2 Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fifth Edition, Pearson Education Asia, New Delhi, 2014
3 Swapan kumar chakraborty and Bikash kanti sarkar, "Discrete Mathematics", Oxford University Press, 2011

Online References:

1 https://onlinecourses.nptel.ac.in/noc18_cs53
2 https://onlinecourses.nptel.ac.in/noc16_ma01
3 http://www.nptel.ac.in/courses/111105035
4 https://www.youtube.com/watch?v=p2b2Vb-cYCs
5 https://www.youtube.com/watch?v=6RX_FVCoKwo

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	20 %	20 %	30 %	20 %	20 %
Apply	60 %	80 %	70 %	60 %	60 %
Analyze	20 %	-	-	20 %	20 %
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution , Part A : 20 %, Part B : 80 %

18IT301 **OBJECT ORIENTED PROGRAMMING** **3/0/0/3**

Nature of Course : Theory Programming
Pre requisites : 18CS101- C Programming for Problem Solving
Co- requisite(s) :-

Course Objectives:

To impart in-depth knowledge of object-oriented programming principles and concepts using C++ and JAVA and enable the students to develop real time application.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1 Understand the features of Object Oriented programming paradigm. [U]
CO2 Use the forms of inheritance and constructor in Real world scenario. [AP]
CO3 Implement programs using Package and interface concepts [AP]
CO4 Utilize I/O functionality to code basic file operations and experiment with exception handling. [AP]
CO5 Apply the concepts of multithreading, Event handling, collection framework and Swing to develop real time applications. [AP]

Course Contents:

OOP Concepts-Survey of programming paradigms - Object-Oriented Paradigm- Elements of Object Oriented Programming -Merits and demerits of object oriented methodology-Benefits of Object Oriented Programming ,Structure of C++ program,Classes and Objects, inline functions ,Constructors and its types - Constructor Overloading, Destructors , Inheritance-Base class and derived class relationship - Forms of inheritance ,polymorphism. JAVA: Features of Java, Data Types, Variables, Operators, Arrays, Control Statements. Classes and Objects, Methods, Access Specifier , Constructor, Nested Classes,Inner Classes ,Command line arguments ,String Handling ,Inheritance- Inheritance types- Method overloading, Method overriding, Abstract Classes, Packages - Access protection - Importing packages , Interface - Defining and Implementing Interface - Applying Interface - Variables in Interfaces, Exceptions- Exception Handling Fundamentals- Exception types - Uncaught Exception - Using Try and Catch - Multiple catch clauses - Nested try statements - throw - throws - Java Built-in Exception - Creating user defined Exceptions. I/O Basics-Stream classes- Byte Streams –Character streams, Multithreading-Java thread model- Thread class and runnable Interface - Main thread - Creating the Thread- Priorities – Synchronization, Introduction to AWT , Event Handling, Swing ,Collection framework-List-Set-Map, JDBC Connectivity.

Total Hours **45**

Text Books:

1 Herbert Schildt." The Complete Reference C++" ,5th Edition, MH, 2012.
2 Herbert Schildt, "Java : The Complete Reference", 9th edition, TMH, 2014.
3 Paul Deitel, Harvey Deitel, "Java How To Program", 10th Edition, Prentice Hall Publications,2014.

Reference Books:

1 BjarneStroustrup "Principles and Practice Using C++", 2nd edition,Addison Wesley,2014
2 Y. Daniel Liang ,"Introduction to Java Programming", 9th Edition , Prentice Hall Publications ,2015

Online References:

1 http://www.nptel.ac.in
2 http://www.javaworld.com
3 https://www.coursera.org/learn/c-plus-plus-a
4 https://www.coursera.org/learn/object-oriented-java
5 https://www.coursera.org/specializations/java-object-oriented

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	25 %	30 %	20 %	20 %	20 %
Apply	75 %	70 %	80 %	80 %	80 %
Analyze	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Course Incharge CSE | Course Incharge IT | chairman - BOS/CSE | chairman-BOS/IT

18CS301 **COMPUTER ARCHITECTURE** **3/0/0/3**

Nature of the Course : Theory
Pre requisite(s) : -
Co-Requisite(s) : 18ECS11- Digital Principles and System design

Course Objective:

To cultivate a deep knowledge of modern computing technology through hardware/ software interface and by exploring how machines are designed, built, and operate.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Understand the basic functionalities of computer organization.	[U]
CO2	Manipulate data using arithmetic instructions in computers.	[AP]
CO3	Analyze memory management techniques and pipelining concepts.	[AN]
CO4	Select appropriate interface standards for I/O devices.	[AN]
CO5	Understand various multicore architectures	[U]

Course Contents:

Basic structure of Computer-Functional units-Operation concepts- CPU performance-Instruction sequencing-Addressing modes-Basic I/O operations,Processing-Fundamental concept-Execution of a Complete Instruction-Hardwired Control-Micro Programmed Control-Case study: Instruction sets &it's working, Arithmetic Operations-Addition and subtraction of signed numbers -Design of Fast adders-Multiplication of signed and unsigned numbers-Fast multiplication-Integer division-Floating point operations,Memory- Basic concepts-Semiconductor RAMs-ROMs-Cache memories -Performance consideration-Virtual memory - Memory Management requirements, Pipelining-Basic Concepts-Data Hazards-Instruction Hazard- Influence on Instruction Sets-Data Path and Control Consideration-Superscalar Operation- Case study :A sequential Y86-64 design-Sun Ultra SPARC II pipeline structure, I/O organization- Accessing I/O devices-Interrupts-Direct Memory Access-Buses-Standard I/O interface, Introduction to Multicore Architecture- Multicore Processors-Centralized and Distributed shared-memory architecture- Cluster computers -HP Moonshot.

Total Hours: 45

Text Books:

1. Carl Hamachar, ZvoncoVranesic and SafwatZaky, Computer Organization and Embedded systems, McGraw-Hill- 6th Edition 2012.
2. David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Elsevier, 4th edition 2012.

Reference Books:

1. John P. Hayes, Computer Architecture and Organization, McGraw-Hill 3rd edition, 2013
2. Morris Mano M, Computer System Architecture, Pearson India, Revised 3rd Edition,2017
3. John Paul Shen and Mikko H. Lipasti, Modern Processor Design: Fundamentals of Superscalar Processors, Tata McGraw-Hill, 1st edition 2013
4. M. J. Flynn, Computer Architecture: Pipelined and Parallel Processor Design, Narosa Publishing House
5. Randal E. Bryant , David R. O'Hallaron, Computer Systems: A Programmer's Perspective,Pearson Publication 3rd edition,2016

Online References:

1. https://www.coursera.org/learn/making-architecture
2. http://fmcet.in/CSE/CS6303_uw.pdf
3. http://nptel.ac.in/courses/106102062/

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	20 %	-	20 %	20 %	20 %
Apply	40 %	40%	40 %	40 %	40 %
Analyze	40 %	60%	40 %	40 %	40 %
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Course Incharge CSE | Course Incharge IT | Chairman-BoS/CSE | Chairman-BoS/IT

18CS302 **DATA STRUCTURES** **3/0/0/3**

Nature of Course :Theory Programming
Pre requisite(s) : 18CS101- C Programming for Problem Solving
Co-Requisite(s) :-

Course Objectives:

To emphasize the importance of data structures and algorithms, introduce the concept of data structures and recommend suitable data structure to solve Real-world scenarios.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Understand the concepts of determining the algorithm efficiency.	[U]
CO2	Demonstrate the application of linear data structures on various problems.	[AP]
CO3	Solve real-time problems using non-linear data structures.	[AP]
CO4	Illustrate the concepts of hashing and collision resolution methods	[U]
CO5	Select appropriate sorting and searching technique for a given problem	[AP]

Course Contents:

Complexity Analysis - Algorithms, Time and Space Complexity, Asymptotic Notations, Importance of efficient algorithms, Data Structures - Classification, Abstract Data Type (ADT), Implementation, Linear Data Structures -List ADT - Singly - Doubly - Circular Linked List, Stack ADT- Stack operations and its applications, Queue ADT-Queue - Circular Queue - Double ended Queue, Applications, Trees And Hashing - Tree, Expression evaluation, Traversals, Binary Search Trees (BST), AVL Trees, Tries, Binary Heap - Priority Queue, Hashing - Hash function - Open & Closed Hashing, Sorting and Searching - Sorting - Selection - Insertion - Bubble - Quick - Merge, Searching - Linear - Binary, Graphs - Traversal, Topological Sort, Shortest Path Algorithms - Dijkstra's Algorithm, Minimum Spanning Tree - Prim's and Kruskal's Algorithm, Bi-Connectivity, Applications of graph.

Total Hours: **45**

Text Books:

1 M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia, 2007
2 Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, "Introduction to Algorithms", Paper Back 2010, 3rd Edition, MIT Press, 2010(Reprint).

Reference Books:

1 V. Aho, J.E. Hopcroft and J. D. Ullman," Data Structures and Algorithms", Pearson India, 1st Edition, 2002.
2 Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2nd Edition, 2009.
3 Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 2007.
4 J. Tremblay, P. Soresan, "An introduction to data structures with Applications", McGraw-Hill, 2nd edition, 2007.

Online References:

1 http://nptel.ac.in/courses//106103069/
2 http://web.stanford.edu/class/cs97si/
3 https://www.coursera.org/learn/data-structures
4 https://www.coursera.org/specializations/data-structures- algorithms
5 http://nptel.ac.in/courses//data-structures

Assessment Methods & Levels (based on Blooms' Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment			End Semester Examination (Theory) [60 marks]
		CIA1 [6 marks]	CIA2 [6 marks]	Term End Assessment [8 marks]	
Remember	-	-	-	-	-
Understand	25%	50%	20%	30%	30%
Apply	75%	50%	80%	70%	70%
Analyse	-	-	-	-	-
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

[Course Head] [Chairman-BoS/CSE] [Chairman-BoS/IT]

18ECS11 **DIGITAL PRINCIPLES AND SYSTEMS DESIGN** **3/0/2/4**
(Common to CSE/IT)

Nature of the Course : Theory analytical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:
To enable them to design and analyse combinational and sequential circuits

Course Outcomes:
Upon completion of the course, students shall have ability to

CO1	Demonstrate knowledge on recalling the number systems, Boolean algebra and the operation of basic logic gates	[U]
CO2	Design different combinational logic circuits by applying logic minimization techniques as well as using Programmable Logic Devices	[AP]
CO3	Understand the working of flip-flops and their applications	[U]
CO4	Design and Analyse different sequential logic circuits	[AN]
CO5	Evaluate and Construct simple digital circuits using combinational and sequential logic principles	[C]

Course Contents:
Theory
Introduction: Number Systems- Binary codes – Binary Arithmetic - Boolean algebra - Boolean functions – K Maps, Quine-McCluskey method **Logic Gates:** Synthesis of Logic Circuits using NAND/NOR gates (Two Level/Multilevel Implementation). **Combinational Logic:** Analysis and Design Procedures, Circuits for Arithmetic Operations, Multiplexer, Demultiplexer, Decoder, Encoders, and their use in logic synthesis, Hazards in combinational circuits. **Synchronous Sequential Logic:** Latches, Flip flops, Analysis and Synthesis of clocked sequential circuits, State table reduction. **Registers and Counters:** Registers, Shift Registers, Ripple Counters, Synchronous Counters, Special Counters. **Memory:** RAM-ROM -Memory Decoding. **Programmable Logic Devices:** Programmable Read Only Memory, Programmable Logic Array, Programmable Array Logic
Practical
Analysis and Synthesis of Combinational Logic Circuits: Boolean function verification, Code Converter, Parity Generator and Checker, Two bit magnitude comparator, Arithmetic Circuits, Multiplexer, **Analysis and Synthesis of Sequential Logic Circuits**: Shift Register , Asynchronous/ Synchronous Counter, Testing/Tracing Logic Circuits ,Schematic Review of Logic Circuits, Mini Project

Total Hours: 75

Text Books:
1 M. Morris Mano, Michael D. Ciletti., "Digital Design",5th Edition, Pearson education,2013
2 C. H. Roth Jr., Larry L. Kinney "Fundamentals of Logic Design", 7th Edition, Cengage Learning, 2014.

Reference Books:
1 Donald D. Givone, "Digital Principles and Design", 7th Edition, McGraw-Hill, 2010.
2 Donald P leach, Albert Paul Malvino, GoutamSaha, "Digital Principles and Application", 8th Edition., McGraw Hill education (India) Private Limited, 2015

Online References:
1 http://nptel.ac.in/course.php?disciplineId=117
2 http://www.nesoacademy.org/electronics-engineering/digital-electronics/digital
3 http://www.digital.iitkgp.ernet.in/dec/index.php

Assessment Methods & Levels (based on Revised Bloom's Taxonomy)

Bloom's Level	Practical Rubric based CIA [40 Marks]	Continuous Assessment			End Semester Examination [40 marks]
		CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	
Remember	-	-	-	-	-
Understand	-	50 %	20 %	20 %	20 %
Apply	30 %	50 %	40 %	40 %	40 %
Analyze	30 %	-	40 %	40 %	40 %
Evaluate	20%	-	-	-	-
Create	20%	-	-	-	-

Mark Distribution , Part A : 20 %, Part B : 80 %

COURSE INCHARGE **COE CO-ORDINATOR** **HOD/ECE**

18MGS01 **Design Thinking** **1/0/2/2**

(Common to CSE, ECE, EEE, ICE and IT branches)

Nature of Course : Practical
Pre-requisite(s) : None
Co-Requisite(s) : None

Course Objectives:

To mentor the students in developing a solid understanding of the fundamental phases and methods in design thinking, develop practical and innovative solutions for design problems through human-focused, prototype-driven, innovative design process.

Course Outcomes:

Upon the completion of the course, students shall have ability to

CO1 Apply design thinking to problems in order to generate innovative and user-centric solutions **[AP]**

CO2 Initiate a new working culture based on a user-centric approach, empathy, ideation, prototyping, and playful testing **[AN]**

CO3 Prototype early and fast, as well as test your prototypes so as to reduce risks and accelerate organizational learning **[E]**

Course Contents:

- Introduction to design thinking
- Use informed data collection for customer insights
- Apply empathy frameworks to develop customer personas
- Identify customers' pain and gain points
- Find inspiration
- Design and create rapid prototypes
- Work on iterative processes to improve business
- Design and implement solutions

Total Hours: 30

Text Books:

1. Jimmy Jain, Design Thinking for Startups: A Handbook for Readers and Workbook for Practitioners, 2018.
2. Idris Mootee, Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School, Wiley, 2017.

Reference Books:

1. Jeanne Liedtka and Tim Ogilvie Designing for Growth: A Design Thinking Tool Kit for Managers (Columbia University Press, 2011)
2. Jeanne Liedtka, Tim Ogilvie, and Rachel Brozenske, The Designing for Growth Field Book: A Step-by-Step Project Guide (Columbia University Press, 2014)

Web References:

1. https://www.pdfdrive.com/search?q=DESIGN+THINKING&pagecount=&pubyear=&searchin=
2. https://swayam.gov.in/courses/3665-understanding-design-thinking-and-people-centred-design

Online References:

1. https://www.coursera.org/learn/design-strategy
2. https://onlinecourses.nptel.ac.in/noc19_mg23/preview
3. https://www.edx.org/course/design-thinking-capstone-ritx-think525x

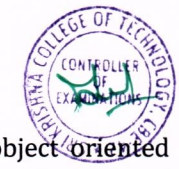
Assessment Methods

Assessment Instruments	Continuous Assessment (100)
Class Room Participation	40
Record Work	40
Viva-Voce	20

Course Designer **HoD**

18IT302 **OBJECT ORIENTED PROGRAMMING LABORATORY** **0/0/3/1.5**

Nature of the Course : Practical
Pre requisite(s) : -
Co-Requisite(s) : -



Course Objectives :

To provide practical exposure to design, develop and test real time application using object oriented programming concepts

Course Outcomes

Upon completion of the course, students shall have ability to

CO1	Demonstrate the use of Object Oriented Concepts in real world problems	[AP]
CO2	Apply the concepts of Packages, Exception Handling, I/O streams and multithreaded programming for various scenarios.	[AP]
CO3	Develop an application using Swing and Event handling mechanism	[E]
CO4	Assess an application developed using JDBC.	[E]

Course Contents

Classes and objects, constructor. Inheritance, Abstract class and Method overloading, String Manipulations, Packages and Interface, Exception handling, File Handling, I/O Streams, Event Handling , Swing, Collection framework, Multithreading, Application development using JDBC.

Total Hours **45**

Reference Books:

1. Herbert Schildt, "Java : The Complete Reference", 9th edition, TMH, 2014
2. Herbert Schildt." The Complete Reference C++" ,5th Edition, MH, 2012
3. Paul Deitel, Harvey Deitel, "Java How To Program", 10th Edition, Prentice Hall publications,2014.

Online Reference

1. http://www.nptel.ac.in
2. http://www.javaworld.com
3. https://www.coursera.org/learn/object-oriented-java
4. https://www.coursera.org/specializations/java-object-oriented

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Rubric based Continuous Assessment [60 marks]	End Semester Examination [40 marks]
Remember	-	-
Understand	-	-
Apply	60%	60%
Analyze	20%	20%
Evaluate	20%	20%
Create	-	-

[Faculty Incharge - CSE] [Faculty Incharge - IT] [Chairman - BOS/CSE] [Chairman - BOS/IT]

18CS303 **DATA STRUCTURES LABORATORY** **0/0/3/1.5**

Nature of Course : Practical
Pre requisite(s) : 18CS101 - C Programming for Problem Solving
Co-Requisite(s) :-

Course Objectives:

To impart knowledge on the applications of data structures, searching and sorting algorithms

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Utilize appropriate data structure and algorithm design method for a specified application.	[AP]
CO2	Solve problems using linear and non-linear data structures.	[AP]
CO3	Implement sorting and searching techniques.	[AP]
CO4	Evaluate applications using algorithms	[E]

Course Contents:

List ADT, Stack ADT, Queue ADT - Circular Queue - Double ended Queue, Tree traversal, Binary Search tree, Searching, Sorting, Graph Traversal – BFS - DFS, Minimum Spanning Tree Algorithms, Shortest Path algorithm - Dijsktra's Algorithm

Total Hours: **45**

Reference Books:

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education Asia, 2007
2. Thomas H. Cormen, C.E. Leiserson, R L. Rivest and C. Stein, "Introduction to Algorithms", Paper Back 2010, Third edition, MIT Press, 2010(Reprint).
3. V. Aho, J.E. Hopcroft and J. D. Ullman," Data Structures and Algorithms", Pearson India, 1st Edition, 2002.
4. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2nd Edition, 2009.
5. Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 2007.

Online References:

1. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
2. https://www.coursera.org/learn/introduction-to-algorithms
3. https://onlinecourses.nptel.ac.in/noc16_cs04/preview
4. https://www.edx.org/course/algorithms-iitbombayx-cs213-3x

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Rubric based Continuous Assessment [60 marks]	End Semester Examination [40 marks]
Remember	-	-
Understand	-	-
Apply	80%	80%
Analyse	-	-
Evaluate	20%	20%
Create	-	-

[Cluster Head] [Chairman - BoS/ISE] [Chairman - BoS/IT]

18MC002 **ENVIRONMENTAL AWARENESS** **2/0/0/0**

(Common to all I B.E/ B. Tech Programmes)

Nature of the Course : Theory
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To create an awareness about the current environmental issues and the social problems.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Understand the importance of natural resources and conservation of biodiversity	[U]
CO2	Analyze the impact of engineering solutions in a global and societal context	[AN]
CO3	Apply the gained knowledge to overcome pollution problems	[AP]
CO4	Apply the gained knowledge in various environmental issues and sustainable development	[AP]

Course Contents:

Forest resources,Use and abuse, case study-Major activities in forest-deforestation-Water resources, over utilization of water, dams-benefits and problems- Mineral resources, Use and exploitation- environmental effects of mining- case study–Food resources, World food problems - case study -Energy resources, Renewable and non-renewable energy sources- Land resources, Soil erosion-desertification – Role of an individual in conservation of natural resources-Environmental Pollution, definition – causes-effects and control measures of Air pollution, Acid rain - Greenhouse effect-Global warming- Ozone layer depletion – case study- Bhopal gas tragedy- Water pollution- Soil pollution - Solid waste management-Recycling of plastics-Pyrolysis method- causes-effects and control measures of municipal solid wastes- Noise pollution-Nuclear hazards-case study-Chernobyl nuclear disaster-Role of an individual in prevention of pollution-Social issues and the Environment, Sustainable development-water conservation- rain water harvesting-E-Waste Management – Environmental ethics-12 Principles of green chemistry-Biofuels-Scheme of labeling of environmental friendly products (Eco mark) – Emission standards – ISO 14001 standard

Total Hours: 30

Text Books:

1. AnubhaKaushik and C P Kaushik "Perspectives in Environmental Studies"4th Edition, Newage International (P) Limited, Publisher Reprint 2014. New Delhi
2. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press 2015

Reference Books:

1. Tyler Miller, Jr., "Environmental Science", Brooks/Cole a part of Cengage Learning, 2014
2. William Cunningham and Mary Cunningham, "Environmental Science",13thEdition,McGraw Hill,2015
3. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", Third Edition, Pearson Education, 2014

Online References:

1. https://www.edx.org/course/subject/environmental-studies
2. www.environmentalscience.org
3. http://nptel.ac.in/courses/104103020/20
4. http://nptel.ac.in/courses/120108002

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment Assessment-I [25 marks]	Assessment-II [25 marks]	Assessment-III [30 marks]
Remember	-	-	-	-
Understand	30 %	30 %	30 %	30 %
Apply	40%	40%	40%	40%
Analyze	30 %	30 %	30 %	30 %
Evaluate	-	-	-	-
Create	-	-	-	-

Mark Distribution, Part A : 20 %, Part B : 80 %

18MAS05 **PROBABILITY & STATISTICS** **3/1/0/4**

(Common to CSE & IT)

Nature of the Course : Theory Analytical
Pre requisite(s) : 18MA101-Linear Algebra and Differential Calculus
18MA201- Integral Calculus and Complex Variables
Co-Requisite(s) : -

Course Objective:

To impart the necessary basic concepts of probability and standard distributions with characteristics of random variables and to analyze the data and testing the hypothesis.

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Understand to handle situations involving one dimensional and two dimensional random variables	[U]
CO2	Apply the probability concepts in solving engineering problems	[AP]
CO3	Use distribution in cluster analysis of similar binary variables	[AP]
CO4	Derive the inference for engineering problems using testing of hypothesis	[AN]

Course Contents:

Probability-Probability concepts,Addition and Multiplication law of probability,Conditional probability,Total probability theorem, Bayes theorem ,Random Variables- One dimensional random variable- Probability mass function, Probability density function, Standard distributions-Discrete distributions, Binomial, Poisson, Geometric, Continuous distributions, Uniform ,Exponential, Normal distributions, Simple problems, Two dimensional random variables-Joint distributions, Marginal and conditional distributions, Covariance, Correlation, Regression , Testing of Hypothesis –Large samples- Z test –proportions and mean ,Small samples- t- test and F- test–difference of means and variance, Chi-square test for goodness of fit and independence of attributes

Total Hours: 60

Text Books:

1 Gupta, S.C., & Kapoor, V.K., "Fundamentals of Mathematical Statistics", Sultan Chand & sons, Reprint 2014
2 Peebles Jr. P.Z., "Probability Random Variables and Random Signal Principles",Tata McGraw-Hill Pubishers, Fourth Edition, New Delhi, 2016

Reference Books:

1 Ross, S., "A First Course in Probability", Ninth edition, Pearson Education, Delhi, 2014.
2 Henry Stark and John W. Woods , "Probability, Statistics, and Random Processes for Engineers", Pearson Education, Fourth Edition, Delhi, 2012
3 Palaniammal, S., "Probability and Random Processes", Prentice hall of India, New Delhi, 2014

Online References:

1 https://www.probabilitycourse.com/
2 https://books.google.com/books/about/PROB_STATS_RANDOM_PROC_3E.html?id=1_jaeMHrxRwC
3 https://www.class-central.com/course/independent-introduction-to-probability-statistics-and-random-processes-2676
4 https://onlinecourses.nptel.ac.in/noc18_ma07
5 https://freevideolectures.com/course/3009/probability-and-statistics

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	30 %	40 %	30 %	30 %	30 %
Apply	50 %	50 %	60 %	60 %	60 %
Analyze	20 %	10 %	10 %	10 %	10 %
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution , Part A : 20 %, Part B : 80 %

18ECS13 **DIGITAL AND MOBILE COMMUNICATION** **3/0/0/3**

Nature of Course :G (Theory Concept)
Pre requisites : -

Course Objectives:

To introduce the key modules of digital communication systems, Spread Spectrum techniques and to provide the vision on cellular networks

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Understand the engineering principles involved in a basic communication system.	[U]
CO2	Classify and compare different digital modulation techniques	[AN]
CO3	Explain the different spread spectrum techniques	[U]
CO4	Understand, Plan and design a quality wireless communication link using fundamental concepts.	[AN]
CO5	Interpret system architecture, roaming strategies in GSM and 4G/LTE systems.	[AN]

Course Contents:

Basics of communication systems-Base band transmission, Need for modulation. Sampling theorem, Pulse code modulation, DPCM,Delta Modulation, ADM,Transmission and reception of BFSK,BPSK,QPSK, Spread spectrum-Direct sequence spread spectrum, Frequency hoppingspread spectrum.Introduction to Wireless Communication - Cellular concepts ,Elements of cellular networks, Handoff strategies, Interference,Coverage and Capacity improvement in Cellular system , Diversity techniques,RAKE receiver, Roaming in wireless and Mobile Networks, Architecture of GSM -Roaming in GSM Network-Roaming Procedures, Roaming call scenarios-3G, 4G(LTE), Basics of 5G.

Total Hours: 45

Text Books:

1 S. Haykin, "Communication Systems", 4th Ed., John Wiley & Sons, 2006.
2 T.S.Rappaport, Wireless Communication Principles (2/e), Pearson, 2008.
3 Shahid K. Diddiqui, "Roaming in Wireless Networks", McGraw Hill Professional.

Reference Books:

1 Jochen Schiller, Mobile Communications(2/e),Pearson, 2008.
2 W.C.Y.Lee, Mobile Communication Engineering. (2/e), McGraw- Hill,1998.
3 B.Sklar, "Digital Communications: Fundamentals & Applications", Pearson Education, (2/e), 2001
4 A.B.Carlson, " Communication Systems", McGraw Hill, 3/e,2009

Web References:

1 https:///www.scilab.org
2 http://youtube.com/user/ScilabChannel
3 https:///www.scilab.org/en/resources/documentation/tutorials
4 https://ce.uci.edu/areas/engineering/networks/
5 http://scpd.stanford.edu/search/publicCourseSearchDetails.do?method=load&courseId=12075
6 https://www.edx.org/course/system-view-communications-signals-hkustx-elec1200-1x-1
7 https://www.udemy.com/introduction-to-wireless-communications/

Assessment Methods & Levels (based on Revised Bloom's Taxonomy)

Bloom's Level	Formative assessment based on CapstoneModel [20 marks]	Continuous Assessment			End Semester Examination [60 marks]
		CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	
Remember	-	-	-	-	-
Understand	10	50 %	40 %	40 %	40 %
Apply	-	30 %	20 %	20 %	20 %
Analyze	10	20 %	40 %	40 %	40 %
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

Mark Distribution, Part A: 20 %, Part B: 80 %

COURSE INCHARGE COE CO-ORDINATOR HOD/ECE

18CS401 **DATABASE MANAGEMENT SYSTEMS** **3/0/0/3**

Nature of the Course : Theory Analytical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:
To learn the fundamentals of data models to conceptualize and design large enterprise database systems.

Course Outcomes:
Upon completion of the course, students shall have ability to

CO1	Understand the basic concepts, terminologies and evolution of database from file system	[U]
CO2	Analyze and derive an information model expressed in the form of an entity relation diagram and transform into a relational database schema	[AN]
CO3	Demonstrate with understanding of SQL Programming language and normalization theory.	[AP]
CO4	Practice the query evaluation techniques, query optimization and familiar with basic database storage structures and access techniques.	[AP]
CO5	Understand the basic concepts of transaction, concurrency control and recovery mechanisms	[U]

Course Contents :
Data Modelling Introduction, Characteristics of databases –File systems vs Database systems- Evolution of DBMS – Users of database systems- Three level DBMS Architecture and Data Abstraction- Database system architecture –Designing an enterprise database system- Introductions to data models – Benefits of data model – Phases of data modelling- Entity–Relationship model – E-R Diagrams – Extended E-R Diagram – Evaluating data model quality - The relational Model – Schema – Keys- Relational Algebra – Domain Relational Calculus- Tuple Relational Calculus - Fundamental operations, Relational Database Design And Querying, Introduction – Undesirable Properties of Relations – Functional Dependency- Single Valued Dependency Single valued Normalization (1NF, 2NF 3NF & BCNF)- Desirable properties of Decompositions – De-normalization- SQL fundamentals – Views - Integrity – Procedures, Functions, Cursor and Triggers- Advanced SQL features –Embedded SQL – Dynamic SQL- Transaction Concepts – Transaction model – ACID Properties – Serializability, Storage Techniques And Query Processing Introduction – Overview of physical storage media- File structures – Index and Index types –B Tree, B+ Tree- Hashing – Static Hashing – Dynamic Hashing- Introduction to Query Processing – Issues in query optimization – Steps in query processing , Distributed database Implementation- Concurrent transactions - Concurrency control -Deadlock- Lock based protocols- Recovery System – Failure classification.

Total Hours: **45**

Text Books:
1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 6th Edition, Tata McGraw Hill, 2011.
2. Gupta G K, "Database Management Systems", Tata McGraw Hill Education Private Limited, New Delhi, 2011.

Reference Books:
1. RamezElmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 4th Edition , Pearson / Addisionwesley, 2007
2. Raghu Ramakrishnan, Gehrke, "Database Management Systems", 3rd Edition, McGraw Hill, 2006
3. Peter rob, Carlos Coronel, "Database Systems – Design, Implementation and Management", 9th Edition, Thomson Learning. 2009.

Online Resources:
1. https://www.udemy.com/database-management-system/
2. http://www.nptelvideos.in/2012/11/database-management-system.html
3. https://lagunita.stanford.edu/courses/Engineering/db/2014_1/about
4. http://nptel.ac.in/courses/106106093/
5. https://alison.com/courses/IT-Management-Software-and-Databases
6. https://mva.microsoft.com/en-us/training-courses/database-fundamentals-8243?l=TEBiexJy_5904984
7. http://www.sqlcourse.com/
8. https://www.coursera.org/learn/database-management

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Continuous Assessment: Formative assessment based on Capstone Model [20 Marks]	Continuous Assessment: CIA-I [6 marks]	Continuous Assessment: CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	20%	40%	20%	20%	20%
Apply	50%	-	80%	60%	60%
Analyse	30%	60%	-	20%	20%
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

[Cluster Head] [Chairman - BOS/CSE] [Chairman - BOS/IT]

18CS402 **DESIGN AND ANALYSIS OF ALGORITHMS** **3/0/0/3**

Nature of Course : Theory Programming
Pre requisite(s) : 18CS302 Data Structures
Co-Requisite(s) :

Course Objectives:

To introduce different paradigms of problem solving and methods of complexity estimation of algorithms

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Apply suitable algorithm design techniques for developing efficient algorithms	[AP]
CO2	Estimate and compare the time and space complexities of different algorithms.	[AN]
CO3	Apply mathematical preliminaries to the analysis and design stages of algorithms	[AP]
CO4	Understand P, NP and NP-Completeness.	[U]

Course Contents:

Algorithm Analysis - Importance, role of algorithms in computing, Algorithm efficiency - Mathematical analysis for Recursive and Non-recursive algorithms, Empirical analysis of algorithm, Brute Force Approach - Selection Sort, Bubble Sort - Sequential Search - String Matching - KMP, Decrease And Conquer Technique - Insertion sort - Topological sort, Divide and Conquer Technique - Merge sort - Quick sort - Binary search - Strassen's Matrix Multiplication, Dynamic Programming - Knapsack Problem and Memory functions - Optimal Binary Search Trees - Warshall's and Floyd's Algorithms, Greedy Technique - Prims Algorithms - Kruskal's Algorithm - Dijkstra's Algorithm - Huffman Trees and Codes, Solvability - Lower-Bound Arguments - Decision Trees - P - NP and NP-Complete Problems, Backtracking - n - Queens Problem - Hamiltonian Circuit Problem - Subset Sum Problem, Branch and Bound Technique - Assignment Problem - Knapsack Problem - Travelling Salesman Problem - Approximation Algorithms - Vertex-cover problem - Travelling Salesman Problem

Total Hours: 45

Text Books:

1 Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Publications, 3rd Edition, 2012.
2 Thomas H. Cormen, Charles E. Leiserson, R.L. Rivest, "Introduction to Algorithms", Prentice Hall of India Publications, 3rd Edition, 2009.

Reference Books:

1 Horowitz, S. Sahni and S. Rajasekaran, "Computer Algorithms," 2nd Edition, Galgotia Publications, 2008.
2 Sara Baase and Allen Van Gelder, "Computer Algorithms: Introduction to Design and Analysis", Pearson Publications, 3rd Edition, 2008.

Online Resources:

1 https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
2 https://www.coursera.org/learn/introduction-to-algorithms
3 https://onlinecourses.nptel.ac.in/noc16_cs04/preview
4 https://www.edx.org/course/algorithms-iitbombayx-cs213-3x

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	12.5%	20%	-	20%	20%
Apply	37.5%	40%	60%	40%	40%
Analyze	50%	40%	40%	40%	40%
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

[Cluster Head] [Chairman - BoS (CSE)] [Chairman - BoS (IT)]

18CS403 **OPERATING SYSTEMS** **3/0/0/3**

Nature of the Course : Theory analytical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To impart knowledge on basics of operating systems, process management, memory management and storage management

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Comprehend the basic concepts of Modern operating systems	[U]
CO2	Implement process scheduling, synchronization and deadlock in real computing problems	[AP]
CO3	Experiment different memory management schemes	[AP]
CO4	Inspect appropriate file system and disk organization techniques for a variety of computing scenario	[AN]

Course Contents:

Introduction to Modern Operating Systems - Single processor-multiprocessor-clustered systems, Operating System Structure, Operating System Operations, Operating System Services, User and Operating System Interface, System calls and its types, system boot. Process Management-Process, operations-interprocess communication, thread models-thread libraries-thread issues, Process scheduling-Basic concepts-criteria-scheduling algorithms, Realtime CPU scheduling-Minimizing latency-Priority-Based Scheduling-Rate-Monotonic Scheduling-Earliest-Deadline-First Scheduling. Process synchronization - The Critical-Section Problem - Peterson's Solution, Synchronization Hardware-Mutex Locks-Semaphores-Classic Problems of Synchronization-Monitors. Deadlocks-system model-characteristics-prevention-avoidance-detection-recovery.MemoryManagement- Background-Swapping-Contiguous Memory Allocation, Segmentation, Paging-Structure of the Page Table, Virtual memory-demand paging-copy–on-write, page replacement algorithms-allocation of frames-thrashing. Storage management-File system-concepts-access methods-directory and disk structure-mounting-file sharing-protection. File system implementation-directory implementation, allocation methods, free space management. Disk structure-disk scheduling, swap space management. Case Study-Process management and scheduling in Linux, Design Principles in Windows, Memory management in Mach.

Total Hours: 45

Text Books:

1 Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts" 9th Edition, John Wiley, 2016
2 D.M.Dhamdhere, "Operating systems- A Concept based Approach" 2nd Edition, Tata Mc – Graw Hill, 2010.

Reference Books:

1 Andrew S. Tanenbaum, "Modern Operating Systems", Fourth Edition,Pearson Education/PHI 2014.
2 Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004.
3 Harvey M. Deital, "Operating Systems", Third Edition, Pearson Education, 2004.
4 Tanenbaum,"Modern Operating Systems," 3/e, Pearson Edition, 2007.

Online References:

1 https://nptel.ac.in/courses/106106144/
2 http://geeksforgeeks.org/OperatingSystems/
3 https://www.coursera.org/learn/os-power-user#syllabus

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	End Semester Examination [60 marks]
Remember	-	-	-	-	-
Understand	30%	60%	20%	20%	20%
Apply	50%	40%	80%	40%	40%
Analyze	20%	-	-	40%	40%
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

[Faculty Incharge] [Chairman BoS CSE] [Chairman - BoS/IT]

18IT401 **SOFTWARE ENGINEERING** **3/0/0/3**

Nature of the Course : Theory
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To impart knowledge on software engineering concepts to readily changing environments using the appropriate theory, principles and processes

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	To Understand the different Perspective Models.	[U]
CO2	Apply the basics of Requirement Analysis to prepare a SRS Report for any real time application.	[AP]
CO3	Analyze the various system models to describe the behavior of the system.	[AN]
CO4	Distinguish the performance of different Testing Techniques.	[AN]
CO5	Utilize Project Management Practices for Real Time Applications.	[AP]

Course Contents:

Software process-Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models - Waterfall Model – Incremental Process Model – Evolutionary Process Model – Spiral Model – Concurrent Models, Introduction to Agility-Agile process-XP Process, Software Requirements modelling - Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation, requirements management, Case Study – SRS Report for a Lab Administration Project, software design - Fundamental design concepts and principles; Design characteristics; System Models - Context, Behavioral, Data and, Object models, Architectural design- System structuring, Control models; Structured design; Object-oriented analysis and design; User interface design; Design for reuse; Design patterns. testing and maintenance - Software testing fundamentals-Internal and external views of Testing-Software Testing Methods: Black Box Testing, White Box Testing- Functional Testing-System Testing And Debugging –Tools for Testing – Selenium – UFT, project management - Software Project Management - Estimation – LOC, FP Based Estimation, Make/Buy Decision COCOMO I & II Model – SEI CMM and ISO-9001-PERT-COQ-Software reliability and Fault-tolerance, Software project planning, Monitoring, and Control, Software Maintenance, Computer-Aided Software Engineering (CASE) .

Total Hours: 60

Text Books:

1. Roger S. Pressman, —Software Engineering – A Practitioner‟s Approach||, Eighth Edition, Mc Graw-Hill International Edition, 2014.
2. Ian Sommerville, —Software Engineering||, 10th Edition, Pearson Education Asia, 2015.

Reference Books:

1. Rajib Mall, —Fundamentals of Software Engineering||, Fourth Edition, PHI Learning PrivateLimited, 2017.
2. Pankaj Jalote, —Software Engineering, A Precise Approach||, Wiley India, 2017.
3. Kelkar S.A., —Software Engineering||, Prentice Hall of India Pvt Ltd, 2013.
4. Stephen R.Schach, —Software Engineering||, Tata McGraw-Hill Publishing Company Limited,2007.

Online References:

1. https://onlinecourses.nptel.ac.in/noc18_cs43/preview
2. http://www.worldwidelearn.com/online-training/softwareengineeringcourses.html
3. https://www.edx.org/course/software-engineering-essentials
4. https://www.simplilearn.com/software-engineer-masters-program-certification-training-course?
5. https://www.coursera.org/courses?query=software%20engineering

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Formative assessment based on Capstone Model [20 marks]	Continuous Assessment			End Semester Examination [60 marks]
		CIA-I [6 marks]	CIA-II [6 marks]	Term End Examination [8 marks]	
Remember	-	-	-	-	-
Understand	30%	40%	20%	20%	20%
Apply	40%	60%	40%	40%	40%
Analyze	30%	-	40%	40%	40%
Evaluate	-	-	-	-	-
Create	-	-	-	-	-

18CS404 **DATABASE MANAGEMENT SYSTEMS LABORATORY** **0/0/3/1.5**

Nature of Course : Practical

Course Objectives:

To train students to design large enterprise database system using Database design concepts

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Sketch ER diagrams for real world applications.	[AP]
CO2	Select suitable SQL commands to manage the database	[AP]
CO3	Build effective Databases for enterprise applications	[AN]
CO4	Understand the basics of NoSQL Databases and cloud storage.	[U]

Course Contents :

Conceptual Database design using E-R DIAGRAM, Implementation of SQL commands DDL, DML, DCL and TCL , Queries to demonstrate implementation of Integrity Constraints, Practice of Inbuilt functions, Implementation of Join and Nested Queries AND Set operators, Implementation of virtual tables using Views, Practice of Procedural extensions (Procedure, Function, Cursors, Triggers) , Database Application Development using JDBC/ODBC, Study of Cloud Storage and NoSQL Databases like MongoDB, Cassandra, Amazon's DynamoDB, Google's Big table etc.

Total Hours: **45**

Reference Books:

1 Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 6th Edition, Tata McGraw Hill, 2011.
2 Gupta G K, "Database Management Systems", Tata McGraw Hill Education Private Limited, New Delhi, 2011.
3 Peter rob, Carlos Coronel, "Database Systems – Design, Implementation and Management", 9th Edition, Thomson Learning, 2009.
4 Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition , Pearson/ Addisionwesley, 2007.

Web References:

1 http://nptel.ac.in/video.php?subjectId=106106093
2 http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-database-systems
3 www.tutorialspoint.com/dbms/

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Rubric based Continuous Assessment[60 marks]	End Semester Examination [40 marks]
Remember	-	-
Understand	20%	20%
Apply	40%	40%
Analyze	40%	40%
Evaluate	-	-
Create	-	-

Course Incharge - CSE

Course Incharge - IT

Chairman - BOS/CSE

Chairman BOS-IT

18CS405 **ALGORITHMS LABORATORY** **0/0/3/1.5**

Nature of Course : Practical
Pre requisite(s) : 18CS302 Data Structures
Co-Requisite(s)

Course Objectives:

To impart knowledge on various design techniques of algorithms, determining the efficiency of algorithms by comparing their complexities

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Implement recursive and non –recursive algorithms for specific application.	[AP]
CO2	Apply different problem solving techniques to real world problems.	[AP]
CO3	Analyze the time and space complexities of different algorithms designed to solve a problem.	[AN]
CO4	Perform Competitive analysis of algorithms and choose the efficient.	[AN]

Course Contents:

Recursive and non-recursive algorithms - Analysis, Sorting and Searching algorithms using Brute Force approach, Algorithms using Divide and Conquer technique and Greedy technique for different real-world scenarios, Algorithm to find the valuable set of items in a Knapsack, Algorithm to find and return matching strings, Algorithm to find the Shortest path between every pair of cities using Dynamic Programming, Algorithm for Huffman-tree construction, Algorithms using Backtracking and Branch& Bound techniques to find the shortest tour, Mini project

Total Hours: **45**

Reference Books:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Publications, 3rd Edition, 2012.
2. Thomas H. Cormen, Charles E. Leiserson, R.L. Rivest, "Introduction to Algorithms", Prentice Hall of India Publications, 3rd Edition, 2009.
3. Horowitz, S. Sahni and S. Rajasekaran, "Computer Algorithms," 2nd Edition, Galgotia Publications, 2008.
4. Sara Baase and Allen Van Gelder, "Computer Algorithms: Introduction to Design and Analysis", Pearson Publications, 3rd Edition, 2008.

Online Resources:

1. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html
2. https://www.coursera.org/learn/introduction-to-algorithms
3. https://onlinecourses.nptel.ac.in/noc16_cs04/preview
4. https://www.edx.org/course/algorithms-iitbombayx-cs213-3x

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Rubric based Continuous Assessment[60 marks]	End Semester Examination [40 marks]
Remember	-	-
Understand	-	-
Apply	50%	50%
Analyze	50%	50%
Evaluate	-	-
Create	-	-

[Cluster Head] [Chairman - BOS CSE] [Chairman - BOS IT]

18CS406 **OPERATING SYSTEMS LABORATORY** **0/0/3/1.5**

Nature of the Course : Practical
Pre requisite(s) : -
Co-Requisite(s) : -

Course Objective:

To train students in Unix and shell programs, and in implementing process scheduling, synchronization, deadlocks, Memory Management, file allocation and Disk Scheduling techniques

Course Outcomes:

Upon completion of the course, students shall have ability to

CO1	Build simple shell programs	[AP]
CO2	Examine the efficiency of CPU Scheduling algorithms and synchronization tools	[AN]
CO3	Implement the concepts of Deadlock detection and avoidance mechanisms.	[AP]
CO4	Demonstrate Memory and storage management.	[AP]

Course Contents:

Basic unix commands , Shell Programming, Unix System Calls, Non Preemptive and Preemptive CPU Scheduling Algorithms, Semaphores, Deadlock detection & Avoidance - Banker's Algorithm, Memory Management Techniques, Page Replacement policies, Disk Scheduling Techniques, File allocation Techniques

Total Hours: 45

Reference Books:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts" 9th Edition, John Wiley, 2016
2. D.M.Dhamdhere, "Operating systems- A Concept based Approach" 2nd Edition, Tata Mc – Graw Hill, 2010.
3. AndrewS. Tanenbaum, "Modern Operating Systems", Fourth Edition, Pearson Education/PHI 2014.
4. Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004.

Online References:

1. https://nptel.ac.in/courses/106106144/
2. http://geeksforgeeks.org/OperatingSystems/

Assessment Methods & Levels (based on Bloom's Taxonomy)

Bloom's Level	Rubric based Continuous Assessment [60 marks]	End Semester Examination [40 marks]
Remember	-	-
Understand	20%	20%
Apply	60%	60%
Analyze	20%	20%
Evaluate	-	-
Create	-	-

[Faculty Incharge] [Chairman BOS CSE] [Chairman-BOS IT]

18MC003 **Indian Constitution**

Nature of Course : Theory
Pre- requisite(s) : Nil
Co- requisite(s) : Nil

Course Objectives:
To Know about Indian Constitution.
To Know about Central And State Government Functionalities In India.

Course Outcomes:
Upon completion of the course, students shall have ability to

CO1	Understand the functions of the Indian Government	[U]
CO2	Remember and abide the Rules of The Indian Constitution.	[R]
CO3	Understand state and central policies (Union and State Executive), fundamental Rights & their duties	[U]
CO4	Have general knowledge and legal literacy about Indian Constitution and thereby it helps to take up competitive examinations	[AP]

Course Contents:
Theory
Constituent Assembly of India -The Making of the Constitution and Salient features of the Constitution– Fundamental Rights & Fundamental Duties. Union Government – Structures Of The Union Government and functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court Of India – Judicial Review. State Government – Structure and functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System In States – High Courts and Other Subordinate Courts.

Total Hours : 15

Text Books:
1.Durga Das Basu (DD Basu): "Introduction to the Constitution on India", Twenty-Third 2018 edition, Lexis Nexis Publishing
2. M.V.Pylee, "India's Constitution, S Chand & Company; 16th 2016 edition, S Chand & Company

Reference Books:
1.Shubham Singla, Charles E. Haries: "Constitution of India and Professional Ethics" by Cengage Learning India Private Limited, Latest Edition – 2018
2. Constitution of India. M. Laxmikanth. Cengage Learning India (2018)

Online References:
https://www.india.gov.in/my-government/constitution-india/constitution-india-full-text

Assessment Methods

Assessment Instruments	Marks
Quiz 1	25
Quiz 2	25
Quiz 3	25
Quiz 4	25

Course Designer

HoD