BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE
IN FACULTY OF SCIENCE & TECHNOLOGY)
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

III - SEMESTER B.E. (COMPUTER SCIENCE & ENGINEERING)

Course Code	Course Title	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks (Sessional)		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
3BECS01	**Applied Mathematics-III**	3	1	0	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
3BECS02	**Computer Architecture & Organization**	3	1	0	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
3BECS03	**Advanced- C Programming**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
3BECS04	**Basic Electronics**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
3BECS05	**Digital Circuits & Fundamentals of Microprocessor**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
3BECS06	**Advanced- C Programming**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
3BECS07	**Basic Electronics**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
3BECS08	**Digital Circuits & Fundamentals of Microprocessor**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
		15	5	6	23	-									
		26			**23**					**500**				**150**	
						650									

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
IN FACULTY OF SCIENCE & TECHNOLOGY)
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

IV - SEMESTER B.E. (COMPUTER SCIENCE & ENGINEERING)

Course Code	Course Title	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks (Sessional)		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
4BECS01	**Applied Mathematics – IV**	3	1	0	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
4BECS02	**Data Structures**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
4BECS03	**Database Management System**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
4BECS04	**Theory of Computation**	3	1	0	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
4BECS05	**Object Oriented Programming**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
4BECS06	**Data Structures**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
4BECS07	**Database Management System**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
4BECS08	**Object Oriented Programming**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
		15	5	6	23										
		26			**23**					**500**				**150**	
						650									

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
IN FACULTY OF SCIENCE & TECHNOLOGY)
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

V - SEMESTER B.E. (COMPUTER SCIENCE & ENGINEERING)

Course Code	Course Title	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks (Sessional)		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
5BECS01	**System Programming**	3	1	0	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
5BECS02	**Design and Analysis of Algorithms**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
5BECS03	**Java Programming**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
5BECS04	**Software Engineering**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
5BECS05	**IDCC-I**	3	0	0	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
5BECS06	**Design and Analysis of Algorithms**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
5BECS07	**Java Programming**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
5BECS08	**Software Engineering**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
5BECS09	**Seminar**	0	0	2	2	-	**-**	**-**	**-**	-	-	**50**	**-**	50	25
		15	4	8	23										
		27			**23**					**500**				**200**	
						700									

Seminar: A student is required to prepare an advanced technical topic of his/her area of interest from the stream and deliver before a seminar guide. Also he/she is required to submit seminar report.

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
IN FACULTY OF SCIENCE & TECHNOLOGY)
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

VI - SEMESTER B.E. (COMPUTER SCIENCE & ENGINEERING)

Course Code	Course Title	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks (Sessional)		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
6BECS01	**Web Technology**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
6BECS02	**Computer Network & Communication**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
6BECS03	**Computer Graphics**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
6BECS04	**Principles of Management Information System**	3	1	0	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
6BECS05	**IDCC-II**	3	0	0	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
6BECS06	**Audit Heads**	0	0	0	5	**Audit Course**									
6BECS07	**Web Technology**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
6BECS08	**Computer Network & Communication**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
6BECS09	**Computer Graphics**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
6BECS10	**Industry Exposure Program**	0	0	0	2	-	**-**	**-**	**-**	-	-	**50**	**-**	50	25
		15	4	6	23										
		25			**23**					**500**				**200**	
		700													

Note: Industry Exposure Program for two weeks shall be required to be completed by every student by beginning of the semester.

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
IN FACULTY OF SCIENCE & TECHNOLOGY)
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM

VII - SEMESTER B.E. (COMPUTER SCIENCE & ENGINEERING)

Course Code	Course Title	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks (Sessional)		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
7BECS01	**Operating System**	3	1	0	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
7BECS02	**Software Testing and Quality Assurance**	3	1	0	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
7BECS03	**Computer System Security**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
7BECS04	**TCP/IP and Internet**	3	0	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
7BECS05	**CE-I** **1.Neural Network & Fuzzy Logic** **2.Advanced Computer Architecture** **3.Enterprise Resource Planning** **4.Multimedia Systems** **5.Digital Image Processing**	4	0	0	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
7BECS06	**Computer System Security**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
7BECS07	**TCP/IP and Internet**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
7BECS08	**Major Project Literature Review & Presentation**	0	0	2	4	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
		16	3	6	24										
		25			**24**					**500**				**150**	
						650									

BACHELOR OF ENGINEERING (FOUR YEARS DEGREE COURSE)
IN FACULTY OF SCIENCE & TECHNOLOGY)
TEACHING AND EXAMINATION SCHEME WITH CHOICE BASED CREDIT SYSTEM
VIII - SEMESTER B.E. (COMPUTER SCIENCE & ENGINEERING)

Course Code	Course Title	Teaching Scheme				Examination Scheme									
		Hours per week			No. of Credits	Theory						Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks	Max. Marks Sessional		Total	Min. Passing Marks	Max. Marks	Max. Marks	Total	Min. Passing Marks
							ESE	MSE	IE			TW	POE		
8BECS01	**Compiler Construction**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
8BECS02	**Data Warehousing and Data Mining**	3	1	-	3	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
8BECS03	**CE-II** **1.Cloud Computing** **2.Advanced Database** **3.Distributed System** **4.E-Commerce**	4	0	0	4	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
8BECS04	**OE-I**	2	0	0	2	3	**80**	**10**	**10**	100	40	**-**	**-**	-	-
8BECS05	**Compiler Construction**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
8BECS06	**Data Warehousing and Data Mining**	0	0	2	2	-	**-**	**-**	**-**	-	-	**25**	**25**	50	25
8BECS07	**Major Project**	0	0	6	6	-	**-**	**-**	**-**	-	-	**75**	**75**	150	75
		12	2	10	22										
		24			**22**					**400**				**250**	
						650									

INTER DISCIPLINARY CLUSTER COURSES

V – SEMESTER				VI - SEMESTER			
S.N.	COURSE TITLE	CODE	PARENT BOS	S.N.	COURSE TITLE	CODE	PARENT BOS
01			ELECTRICAL (EEE)	01			ELECTRICAL (EEE)
02			MECHANICAL	02			MECHANICAL
03			CIVIL	03			CIVIL
04			MINING	04			MINING
05			EN/ ECE/ EXTC	05			EN/ ECE/ EXTC
06	Cyber Security	5BECS05/5BECT05	CT/CSE	06	Internet & Web Technology	6BECS05/6BECT05	CT/CSE
07			INFORM. TECH.	07			INFORM. TECH.
08			INSTRUMENTATION	08			INSTRUMENTATION

LIST OF AUDIT COURSES/ EVENTS

01	Business Communication Skills	07	
02	Advanced Excel	08	
03		09	
04		10	
05		11	
06		12	

PROPOSED COURSES FOR OPEN ELECTIVE

01	Financial Management	04	Project Management & Quality
02	Foundation Course in HR Mgmt.	05	Cyber laws: International Perspective
03	Entrepreneur Development	06	Corporate Ethics

Appendix A

GONDWANA UNIVERSITY, GADCHIROLI

FACULTY OF SCIENCE AND TECHNOLOGY

CONSLIDATED STATEMENT OF VARIOUS PARAMETERS IN TEACHING & EXAMINATION SCHEME OF B.E. (COMPUTER SCIENCE & ENGINEERING)

SR.NO.	SEMESTER	NO. OF THEORY COURSES	NO OF LABS/PRACT	TEACHING HOURS(TH) (L+T)	TEACHING HOURS (PRACT)	TOTAL CREDIT	MAX. THEORY MARKS	MAX.PRACT MARKS	MAX. MARKS TOTAL
1	III	5	3	20	6	23	500	150	650
2	IV	5	3	20	6	23	500	150	650
3	V	5	4	19	8	23	500	200	700
4	VI	5	4	19	6	23	500	200	700
5	VII	5	3	19	6	24	500	150	650
6	VIII	4	3	14	10	22	400	250	650
		29	**20**	**111**	**42**	**138**	**2900**	**1100**	**4000**

Course wise Board of Studies Affiliation

Board of Studies	Course Codes
APPLIED SCIENCES & HUMANITIES	3BECS01, 4BECS01
ELECTRONICS ENGINEERING	3BECS04, 3BECS05

Choice-based Credit System (CBCS)
III-Semester B. E. (Computer Science & Engineering)

Course Code: 3BECS01
Title of the Course: Applied Mathematics-III

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Z-Transform: Definition, Properties, Inverse by partial fractions and convolution theorem. Application of Z-Transform to solve differential equations with constant coefficients. Fourier Integers and Fourier Transforms.	11
II	Matrices: Inverse of Matrix by adjoint and partitioning method. Rank of Matrix and consistency of system of linear simultaneous equations. Linear dependence. Eigen Values and Eigen Vector, Reduction to diagonal form.	08
III	Matrices: Cayley-Hamilton Theorem, Sylvester's Theorem (statement only) . Solution of second order ordinary linear differential equations with constant coefficients by matrix method, Largest Eigen value and corresponding Eigen vector by iteration.	08
IV	Random Variables and Probability Distributions: Random variables discrete and continuous, Probability functions and distribution functions for discrete and continuous random variables, Joint distribution.	09
V	Mathematical Expectation: Mathematical expectation, Variance and Standard Deviation, Moments, Moment generating function, Coefficient of Skewness & Kurtosis.	09
	Total	45

Text Book/s:

1. Higher Engineering Mathematics by B.S. Grewal
2. Probability and Statistics by Murray R. Spiegel

Reference Book/s:

1. A Text Book of Engineering Mathematics by N.P.Bali and Manish Goyal.
2. Mathematics of Engineers, Chandrika Prasad
3. Advance Mathematics for Engineers, Chandrika Prasad
4. Applied Mathematics for Engineers, L.A. Pipes & Harville
5. A Text Book of Applied Mathematics, P.N. Wartikar & J.N. Wartikar

III-Semester B. E. (Computer Science & Engineering)

Course Code: 3BECS02
Title of the Course: Computer Architecture & Organization

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Basic Structure of Computer Hardware and Software: Functional Units, Basic Operational concepts, Bus Structures, Software, Distributed Computing. Addressing Methods and Machine Program Sequencing : Memory Locations, Addresses and Encoding of Information, Main Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language, Stacks, Subroutine.	9
II	The processing Unit: Some Fundamental Concepts, Execution of a complete Instruction, Sequencing of Control Signals. Computer peripherals : I/O Devices. Processors: Introduction to RISC Processors, Array Processors, Loosely coupled, Tightly coupled Systems.	9
III	Microprogrammed Control: Microinstructions, Grouping of control signals, Micro Program Sequencing, Micro instructions with next address field, Perfecting Microinstructions, Emulation, Bit Slices, Introduction to Microprogramming.	9
IV	Arithmetic : Number Representation, Addition of Positive Numbers, Logic Design for Fast Adders, Addition and Subtraction, Arithmetic and Branching Conditions, Multiplications of positive numbers, Signed – Operand Multiplication, Fast Multiplication.	9
V	The Main Memory: Some Basic Concepts, Semiconductor RAM Memories, Memory System Considerations, Semiconductor ROM Memories, Multiple module Memories and Interleaving, Cache Memories, Virtual Memories, Memory Management Requirements.	9
	Total	45

Text Book/s:

1. V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, " Computer Organization", V edition, McGraw-Hill Inc, 1996.Organisation", V edition, McGraw-Hill Inc, 1996
2. Computer Organization & Architecture 7e By william Stallings PHI, edition

Reference Book/s:

1. Computer System architecture: M. Morris Mano PHI, edition

III-Semester B. E. (Computer Science & Engineering)

Course Code: **3BECS03**
Title of the Course: **Advanced-C Programming**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Problem Solving: Flow charts, Tracing flow charts, Problem solving methods, Need for computer Languages, C Language preliminaries: C character set, Identifiers and keywords, Data types, Declarations, Expressions, statements and symbolic constants , Operators and expressions: Arithmetic, unary, logical, bit-wise, assignment and conditional operators, Control statements: While, do-while, for statements, nested loops, if else, switch, break, Continue, and goto statements, comma operators .	09
II	Storage types: Automatic, external, register and static variables. Functions: Defining and accessing, passing arguments, Function prototypes, Recursion, Library functions, Static functions. Arrays: Defining and processing, Passing arrays to a function, Multi-dimensional arrays.	09
III	Strings: Defining and handling of stings, operations on strings. Pointers: Declarations, Passing pointers to a function, Operations on pointers, Pointer Arithmetic, Pointers and arrays, Arrays of pointers function pointers.	09
IV	Structures: Defining and processing, Passing to a function, Unions, typedef, array of structure, and pointer to structure. Dynamic Memory Allocation.	09
V	File structures: Definitions, concept of record, file operations: Storing, creating, retrieving, updating Sequential, relative, indexed and random access mode, Files with binary mode(Low level), performance of Sequential Files, Direct mapping techniques: Absolute, relative and indexed sequential files (ISAM) concept of index, levels of index, overflow of handling. File Handling: File operation: creation, copy, delete, update, text file, binary file. Combining Command-line Arguments and File I/O.	09
	Total	45

Text Book/s:

1. Teach Yourself C by Herbert Schildt , 3rd edition, Tata McGraw Hill
2. C : The Complete reference , by Herbert Schildt , 4thedition,Tata McGraw Hill
3. C – programming by E.Balagurusamy, Tata McGray Hill

Reference Book/s:

1. Let Us C by Y. kanetkar, BPB Publication.
2. Mastering C by K R Venugopal & Prasad, Tata McGray Hill

III-Semester B. E. (Computer Science & Engineering)

Course Code: 3BECS04
Title of the Course: Basic Electronics

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to PN junction diode, Diode equation, Volt-ampere characteristics of p-n diode, , Breakdown Mechanisms (Avalanche and Zener breakdown) Diodes, Zener diode, TunnelDiode, Varactor Diode, LED, photo diode.Rectifiers Circuits:Half wave, full wave,bridge wave. Clipping and Clamping circuits.	09
II	Introduction to Bipolar Junction transistor, Transistor construction, Transistor current components, Input & Output characteristics of transistor in CB, CE, and CC configurations, Transistor biasing, Thermal runaway, Introduction to FET, JFET characteristic, biasing of FET, Comparison of BJT and FET.	09
III	Transistor as an amplifier using Barkhausen's criterion, RC phase shift,Wein bridge,LC oscillators, Crystal oscillators, FET as an amplifier. Power amplifier: classification, Class A, Class B, Class AB and Class C Power amplifier	09
IV	Basic Operational Amplifier Circuits,characteristics of Op-amp, block design,virtual ground, op-amp parameters,Linear and Nonlinear applications of op-amp,Instrumentation amplifier, Bistable ,Astable ,monostable multivibrator using transistor and OP-Amp ,555 Timer and it's applications, Schmitt trigger circuit.	09
V	Nodal and Mesh analysis equilibrium equations,matrix approach for complicated network containing voltage,current sources and reactance,source transformation,duality,Network topology.NetworkTheroms:Superposition,Reciprocity,Thevnins Therom,Nortons Therom,Maximum Power transfer Therom,compensation.	09
	Total	45

Text Book/s:

1. Electronic Devices & Circuits by Millman & Halkias.
2. Operational Amplifier & Applications by R. Gaikwad
3. Linear Network Theory by Kelkar & Pandit
4. Electrical and Electronics Measurements and Instrumentation by A.K.Sawhney

Reference Book/s:

1. Electonic Devices and circuits-I by A.P.Godse & U.A.Bakshi.

III-Semester B. E. (Computer Science & Engineering)

Course Code: **3BECS05**
Title of the Course: **Digital Circuits & Fundamentals of Microprocessor**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Number systems, Boolean Algebra, Basic logic circuits, truth tables, Demorgan's law, basic combinational logic circuits and design, sum of product and product of sum, simplification using K-maps, SSI, MSI,LSI & VLSI circuit classification.	09
II	Combinational Logic : Decoders, Encoders, Multiplexers, Demultiplexers, Code converters, Parity circuits and comparators, Arithmetic modules- Adders, Subtractions (Half and Full), BCD adder/subtractor, ALU.	09
III	Basic sequential circuits- latches and flip-flops: SR-flipflop, D-flipflop, JK flip-flop, T flip-flop, Timing hazards, Race around Condition, J-K Master Slave Flip flop. Excitation tables of Flip Flops, Conversion of one type flip-flop to another type flips flop, Counters, types of Counters, Design of Mod N counters Using K-map, Lock Free Counters, Up down Counter.	09
IV	Introduction to 8085 microprocessor, architecture, instruction set, Timing diagrams, Flags, addressing modes, Assembly language programming, interrupts.	09
V	Memory organization & interfacing. Interfacing I/O devices PPI 8255, 8253, and its organization & interfacing with 8085.	09
	Total	45

Text Book/s:

1. Digital Design by Morris Mano Prentice-Hall, 2007
2. Fundamental of Digital Electronics: A. Anand Kumar.
3. Microprocessor Architecture Programming & Applications with the 8085 by Ramesh Gaonkar

Reference Book/s:

1. Digital Electronics 3rd Edition 2003 by R.P.Jain TATA McGraw-Hill.
2. Digital circuit & design: A. P. Godse.
3. Microprocessor Techniques by A. P. Godse. Technical Publication.

III-Semester B. E. (Computer Science & Engineering)

Course Code: **3BECS06**
Title of the Course: **Advanced- C Programming**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

	List of Practicals
	The student is expected to perform 10 practicals based on following topics.
I	Practical no. 1 & 2 should be based on the basic control structures of C-language.
II	Practical no. 3 should be based on to demonstrate the use of Storage types & Functions.
III	Practical no.4 should be based on Multidimensional Arrays.
IV	Practical no.5 should be based on handling of Strings.
V	Practical no.6 should be based on the use of Pointers.
VI	Practical no.7 should be based on the use of Structures.
VII	Practical no.8 should be based on to demonstrate Dynamic Memory Allocation
VIII	Practical no.9 & 10 should be based on File handling.

III-Semester B. E. (Computer Science & Engineering)

Course Code: **3BECS07**
Title of the Course: **Basic Electronics**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

	List of Practicals
	The student is expected to perform 10 practicals based on following topics.
I	Practicals based on Diode characteristic and biasing
II	Practicals based on Transistor characteristic and its configuration
III	Practicals based on characteristics of Field Effect Transistor
IV	Practicals based on elementary circuit of Op-amp.
V	Practicals based on measurement of Operational amplifier parameter-I
VI	Practical based on measurement of Operational amplifier parameter-II
VII	Practical based on multivibrators using Op-Amp.
VIII	Practicals based on IC-555 timer and its applications.
IX	Practicals based on instrumentation amplifier.
X	Practical based on different network theorems.

III-Semester B. E. (Computer Science & Engineering)

Course Code: **3BECS08**
Title of the Course: **Digital Circuits & Fundamentals of Microprocessor**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

	List of Practicals
	The student is expected to perform 10 practicals based on following topics.
I	Practical no. 1 & 2 should be based on logic gates, de Morgan's laws.
II	Practical no. 3 should be based on Combinational circuits like Adder, Subtracter, Encoders, Decoders, Multiplexers and De-multiplexers.
III	Practical no.4 should be based Sequential Circuits like flip-flops, Counters, Registers.
IV	Practical no.5, 6, 7 should be based on instruction set of 8085 using instructions such as Arithmetic instructions and data transfer instructions.
V	Practical no. 8 should be based on the use of Stack instruction (PUSH, POP).
VI	Practical no.9, 10 should be based on Logical and Branching instructions.

IV-Semester B. E. (Computer Science & Engineering)

Course Code: 4BECS01
Title of the Course: Applied Mathematics-IV

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Set Theory: Basic Concepts of set theory, The power set, Some operations on sets, Venn diagram, Basic set identities, Cartesian product, Properties of binary relation in a set, Matrix and the Graphs of a relation, Equivalence relation, Partial order relation, comp ability, Composition of binary relation, Function, Composition of functions, Inverse Functions, Characteristics Function of a set.	09
II	Mathematical Logic: Statements Connectives: Negotiation, Conjunction, Disjunction, Conditional and biconditional, statement formulas and truth table. Tautologies, Equivalence of formulas, Duality laws, Tautological implication. Theory of inference for statement calculus, Theory of inference for Predicate calculus.	09
III	Algebraic Structures: Semigroups and Monoids, Groups (definitions and examples) Cyclic groups, Permutation groups, subgroups and Homomorphisms. Cosets and Lagranges theorem, Normal subgroups, Rings (definition and examples), subrings, Ring Homomorphisms, Ideals and Quotient Rings, Polynomial Ring, finite fields and integral domain.	09
IV	Lattice Theory & Boolean Algebra: Lattices as partial ordered set (definition and examples), some problems of lattices as algebraic system, Sub lattices, Direct Product, Homomorphism, Some special lattices, Boolean algebra (definition and examples), application to switching circuits.	09
V	Graph Theory: Basic concepts of Graph Theory, Basic definitions, Paths, Rechability and connectedness, Matrix representation of Graphs, Trees, Tree Searching, Undirected Trees, Minimal Spanning Trees.	09
	Total	45

Text Book/s:

1. Discrete Mathematics Structures with application to Computer Science by J.P.Trembly & R. Manohar
2. Discrete Maths for Computer Scientists & Mathematicians (Chapter 2,5,7) by J.L.Mott, A. Kandel, T.P.Baker
3. Discrete Mathematics by J.K.Sharma, Macmillan **Publishers** India

Reference Book/s:

1. Elements of Discrete Mathematics by C.L.Liu., Tata McGraw-Hill, 2008.
2. Discrete Mathematics by Lipschutz, McGraw Hill Professional, 2007
3. Discrete Mathematics by R. Johnsonbaugh., 9th edition, John Wiley & Sons, 2006

IV-Semester B. E. (Computer Science & Engineering)

Course Code: **4BECS02**
Title of the Course: **Data Structures**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Data Structures: Basic Concepts of Data, How to Create programs. Arrays: Ordered Lists, Sparse Matrices, Quick Sort, Merge Sort, Heap Sort, selection & Bubble Sort, Linear Search, Binary Search.	09
II	Stacks & Queues: Fundamentals, Evaluation of expressions, Polish expressions & their compilation, Application of stacks, Multiple stacks & Queues, Priority queues.	09
III	Linked Lists: Singly Linked List, Linked Stacks & Queues, the polynomial addition, Examples on linked list, circular linked list, doubly linked list & dynamic storage management, Generalized list.	09
IV	Trees: Basic Terminology, Basic trees, Binary tree representations, threaded storage representation, binary tree traversals, binary search trees, Application of trees. Preliminary treatment of AVL Trees, B-Trees, Tries.	09
V	Graphs: Definition & terminology, Graph representation : matrix representation of Graph, List of structure, other representation of graphs, Breadth First Search, Depth First Search, Spanning trees, Shortest path algorithm, topological sorting, Critical path.	09
	Total	45

Text Book/s:

1. Fundamentals of Data Structures by Horowitz & Sahani, Galgotia Publications, 1999
2. Algorithms, Data Structures & Programs by Niclaus Worth, Printice Hall ltd
3. Data Structures in C/C++ by Tananbaum, Tata McGraw Hill
4. An introduction to Data Structures with Applications by Trembley & Sonerson, Tata McGraw Hill

Reference Book/s:

1. Data Structure & Program design in C by Kruse, Leung & Tondo, PHI
2. Data Structure Through C, BPB Pub.

IV-Semester B. E. (Computer Science & Engineering)

Course Code: 4BECS03

Title of the Course: Database Management System

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to DBMS :Basic concepts, Advantages of a DBMS over file-processing systems, Data abstraction, Data Models and data independence. Components of a DBMS and overall structure of a DBMS Database terminology Data Modeling: Basic Concepts, Types of data models, E-R data model and Object-oriented data model. Relational, Network and Hierarchical data models and their comparison. Basics of ER diagram, E-R and EER diagramming, Reducing E-R Diagrams to Tables, Generalization, and Aggregation.	09
II	Relational Model: Basic concepts. Attributes and domains. concept of integrity and referential constraints. Relational Query Languages (Relational Algebra and relational Calculus).Concepts of View and triggers. SQL: Structure of a SQL query, DDL and DML, SQL queries, Set Operations, Predicates and Joins, Set membership, Tuple variables, set comparison, ordering of tuples, aggregate functions, nested queries, Database modification using SQL.	09
III	Relational Database Design: Normalization, normal forms, Functional Dependencies, 1NF, 2NF, 3NF, Codd's rule, Notion of a normalized relations, Multi-valued dependency and Join dependency.	09
IV	Transaction management: Basic concept of a transaction, Transaction Model , Log Based Recovery, Buffer Management, Checkpoints, Shadow Paging, Failure With Loss of non-volatile Storage, Stable Storage Implementation. Concurrency Control: Schedules, Testing of Serializability, Lock-based Protocols, Time Stamp Based Protocols, Validation Techniques, Multiple Granularity, Multiversion Schemes, Insert and Delete Operations.	09
V	Database systems Architecture: Centralized, client-server systems, Parallel systems, distributed systems, Web-enabled systems. New Applications: Need for data analysis, Decision support systems, Data Warehouse. On-line Analytical Processing(OLAP), Data mining concepts, spatial and geographical databases, multi-media Databases.	09
	Total	45

Text Books:

1. Database System Concepts by Henry Korth , S. Sudarsan and Others, McGraw Hill
2. Fundamental of Database System – Elmasari , Navathe & Gupta, Pearson Education.
3. Database Systems by S. K. Singh, Pearson Education.

Reference Books:

1. Principles of Database Systems – Ullman, Golgotia Publications 1998.
2. Database System by Connolly, 3rd edition, Pearson Education.

IV-Semester B. E. (Computer Science & Engineering)

Course Code: 4BECS04

Title of the Course: Theory of Computation

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to formal proof – Additional forms of proof – Inductive proofs –. Introduction:alphabets,Strings and Language:automata and Grammars Finite Automata (FA) – Deterministic Finite Automata (DFA)– Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.	09
II	Regular expressions(RE)-Defination,FAand RE,REtoFA,FAtoRE,algebraic laws for RE,application of Res,Regular grammars and FA,FA for regular grammar,Regular grammar for FA,Pumping Lemma..	09
III	Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata.	09
IV	Normal forms for CFG – Pumping Lemma for CFL - Closure Properties of CFL – Turing Machines – Programming Techniques for TM.	09
V	A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post's Correspondence Problem - The classes P and NP.	09
Total		45

Text Book/s:

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2003.

Reference Book/s:

1. H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2003
2. J.Martin, "Introduction to Languages and the Theory of Computation", Third Edition, TMH, 2003.
3. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

III-Semester B. E. (Computer Science & Engineering)

Course Code: **4BECS05**
Title of the Course: **Object Oriented Programming**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Principles of Object-Oriented Programming, Beginning with C++, Tokens, Expressions and Control Structures	09
II	Functions in C++, Function protopying, call by reference, Return by reference, Inline Function, Default Arguments, Function Overloading, Friend and Virtual Function, Classes and Objects, Defining Member Functions, Arrays within a class, Memory allocation for Objects, Arrays of Objects, Objects as Function Arguments, Friend Functions, Pointers to members	09
III	Constructors and Destructors, Parameterized constructors, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy constructors, Dynamic constructors, Constructing Two-dimensional Arrays, const Objects, Operator Overloading and Type Conversions, Inheritance: Extending Classes, Types of inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Member Classes	09
IV	Pointers, Pointers to Objects, this Pointer, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions and Polymorphism	09
V	Managing Console I/O Operations, Working with Files, Templates	09
	Total	45

Text Book/s:

1. Object Oriented Programming with C++ by E Balagurusamy McGraw-Hill
2. Let Us C++ by Y. kanetkar

Reference Books:

4. C++ : The Complete reference , by Herbert Schildt , 4thedition,Tata McGraw Hill
5. Mastering C++ by K R Venugopal & Prasad, Tata McGray Hill

Course Code: **4BECS06**
Title of the Course: **Data Structures**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

Practical: Students should perform 10-12 Experiments from the given list using C.

List of Practical:

1. Write a Menu driven program for Stack Operation.
2. Implement stack as an ADT. Use this ADT to perform expression conversion and evaluation. (Infix - Postfix, Infix-Prefix, Prefix-Infix, Prefix-Postfix, Postfix-Infix, Postfix-Prefix).
3. Write a program for Circular Queue.
4. Write a program for Priority Queue.
5. Write a program for linked list.
6. Write a program for doubly linked list.
7. Write a program for Binary tree.
8. Write a program for BFS.
9. Write a program for DFS.
10. Write a program for Bubble Sort.
11. Write a program for Selection Sort.
12. Write a program for Heap Sort.
13. Write a program for Merge Sort.
14. Write a program for Traversal of Tree: Preorder, Inorder and Postorder.

Course Code: **4BECS07**
Title of the Course: **Database Management System**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

Practical: Students should perform 10-12 Experiments from the given topics.

List of Practical's:

1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update & Delete Commands.
4. Five experiments on PL/SQL queries.
3. Nested Queries & Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions)
6. Front end tools
7. Forms
8. Triggers
9. Menu Design
10. Reports.

III-Semester B. E. (Computer Science & Engineering)

Course Code: **4BECS08**
Title of the Course: **Object Oriented Programming**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

Practical: Students should perform 10-12 Experiments from the given list.

List of Practical:

1. Write a Simple C++ program without using Class & Object
2. Write a program using Class & Object.
3. Write a program using Function Overloading.
4. Write a program using Operator Overloading.
5. Write a program using Inheritance.
6. Write a program using Virtual Function.
7. Write a program using Friend Function.
8. Write a program using Constructor.
9. Write a program using Dynamic Initialization of Objects.
10. Write a program using Copy Constructor.
11. Write a program using Virtual Base Class.
12. Write a program using Abstract Class.
13. Write a program for file handling