SHRI SHANKARACHARYA TECHNICAL CAMPUS

(An Autonomous Institution)

SCHEME OF TEACHING AND EXAMINATION (Effective from 2021 – 2022 Batch)

Computer Science and Business Systems

Semester – 1

Sl. No.	Board of Studies (BOS)	Course Code	Courses	Period per Week			Scheme of Examination			Total Marks	Credit
							Theory/Lab				
				L	T	P	ESE	CT	TA		
1.	Basic Sciences	AM102101	Discrete Mathematics	3	1	-	**80**	20	25	125	4
2.	Basic Sciences	AM102102	Statistics, Probability And Calculus	2	1	-	**80**	20	25	125	3
3.	Computer Science & Engineering	CST102103	Fundamentals Of Computer Science	3	0	-	**80**	20	25	125	3
4.	Electrical Engineering	EE102104	Principles Of Electrical Engineering	2	0	-	**80**	20	25	125	2
5.	Basic Sciences	AP102105	Physics For Computing Science	3	0	-	**80**	20	25	125	3
6.	Humanities	HM102106	Business Communication & Value Science - I	1			**80**	20	25	125	2
7.	Computer Science & Engineering	CS102191	Fundamentals Of Computer Science Lab	-		2	**40**	-	20	60	1
8.	Electrical Engineering	EE102192	Principles Of Electrical Engineering Lab	-		2	**40**	-	20	60	1
9.	Basic Sciences	APT102193	Physics For Computing Science Lab	-		2	**40**	-	20	60	1
10	Humanities	HM102194	Business Communication & Value Science - I	-		2	**40**		20	60	
11	Humanities	HM102195	**Induction Program**		-	-	-	-	10	10	-
Total				**14**	**2**	**8**	**640**	**120**	**240**	**1000**	**20**

L-Lecture T-Tutorial P-Practical

CT-Class Test TA-Teachers Assessment ESE-End Semester Exam

Note:

1. The teaching in the 1st and 2nd Semester will be divided in two groups consisting of various branches.
2. Applied Mathematics-I will be taught to both the groups in the first semester.
3. Self-Learning –I will be conducted by the humanities / relevant discipline as decided by the Director

Subject Code AM102101	DISCRETE MATHEMATICS	L = 2	T = 1	P = 0	Credits = 4
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
• To make students learn the Boolean algebra and its valid applications. • To make students learn concepts of Sets, relations and Group theory. • To make students learn concepts of combinatorics. • To make students learn the basic concepts of Graph theory, understand the concepts of graphs and their matrix representation. • To make student learn the logical structure of statement, validity and satisfiability, karnaugh map.	On successful completion of the course, the student will be: **CO1:** Able to apply Boolean algebra in switching circuits & logic circuits and also karnaugh map. **CO2:** Able to determine the set theory, type of a relation and apply the knowledge using Hass diagram and understand the basics of group theory. **CO3:** Familiar with Combinatorics **CO4:** Familiar with graph theory and its applicability in various computer applications. **CO5:** Able to apply mathematical logic.

UNIT-I Boolean algebra: Introduction of Boolean algebra, truth table, basic logic gate, basic postulates of Boolean algebra, principle of duality, canonical form, Karnaugh map.

UNIT-II Abstract algebra: Set, relation, group, ring, field.

UNIT-III Combinatorics: Basic counting, balls and bins problems, generating functions, recurrence relations. Proof techniques, principle of mathematical induction, pigeonhole principle.

UNIT-IV Graph Theory: Graphs and digraphs, complement, isomorphism, connectedness and reachability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs and tournaments, trees; Planar graphs, Euler's formula, dual of a planer graph, independence number and clique number, chromatic number, statement of Four-color theorem.

UNIT-V Logic: Propositional calculus - propositions and connectives, syntax; Semantics – truth assignments and truth tables, validity and satisfiability, tautology; Adequate set of connectives; Equivalence and normal forms; Compactness and resolution; Formal reducibility - natural deduction system and axiom system; Soundness and completeness.

Text Books:

1. Topics in Algebra, I. N. Herstein, John Wiley and Sons.
2. Digital Logic & Computer Design, M. Morris Mano, Pearson.
3. Elements of Discrete Mathematics, (Second Edition) C. L. Liu McGraw Hill, New Delhi.
4. Graph Theory with Applications, J. A. Bondy and U. S. R. Murty, Macmillan Press
5. Mathematical Logic for Computer Science,L. Zhongwan, World Scientific, Singapore.

Reference Books:

6. Introduction to linear algebra. Gilbert Strang.
7. Introductory Combinatorics, R. A. Brualdi, North-Holland, New York.
8. Graph Theory with Applications to Engineering and Computer Science, N. Deo, Prentice Hall, Englewood Cliffs.
9. Introduction to Mathematical Logic, (Second Edition), E. Mendelsohn, Van-Nostrand, London.

Subject Code AM102102	STATISTICS, PROBABILITY AND CALCULUS	L = 2	T = 1	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes

Unit – 1 Introduction to Statistics: Definition of Statistics. Basic objectives. Applications in various branches of science with examples. Collection of Data: Internal and external data, Primary and secondary Data. Population and sample, Representative sample.

Unit – 2 Descriptive Statistics: Classification and tabulation of univariate data, graphical representation, Frequency curves. Descriptive measures - central tendency and dispersion. Bivariate data. Summarization, marginal and conditional frequency distribution.

Unit – 3 Probability: Concept of experiments, sample space, event. Definition of Combinatorial Probability. Conditional Probability, Bayes Theorem. Probability distributions: discrete & continuous distributions, Binomial, Poisson and Geometric distributions, Uniform, Exponential, Normal, Chi-square, t, F distributions.

Unit – 4 Expected values and moments: mathematical expectation and its properties, Moments (including variance) and their properties, interpretation, Moment generating function.

Unit – 5 Calculus: Basic concepts of Differential and integral calculus, application of double and triple integral.

Text Books:

1. Introduction of Probability Models, S. M. Ross, Academic Press, N.Y.
2. Fundamentals of Statistics, vol. I & II, A. Goon, M. Gupta and B. Dasgupta, World Press.
3. Higher Engineering Mathematics, B. S. Grewal, Khanna Publication, Delhi.

Reference Books:

1. A first course in Probability, S. M. Ross, Prentice Hall.
2. Probability and Statistics for Engineers, I. R. Miller, J.E. Freund and R. Johnson, PHI.
3. Introduction to the Theory of Statistics, A. M. Mood, F.A. Graybill and D.C. Boes, McGraw Hill Education.
4. Advanced Engineering Mathematics, Peter V. O'Neil, Thomson Learning.
5. Advanced Engineering Mathematics, M. D. Greenberg, Pearson Education.
6. Applied Mathematics, Vol. I & II, P. N. Wartikar, Vidyarthi Prakashan.

Subject Code CST102103	FUNDAMENTALS OF COMPUTER SCIENCE	L = 2	T = 1	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes

Unit – 1 General problem Solving concepts: Algorithm, and Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops. Imperative languages: Introduction to imperative language; syntax and constructs of a specific language (ANSI C) Programming Method: Debugging, Macro, User Defined Header, User Defined Library Function, makefile utility.

Unit – 2 Types Operator and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, proper variable naming and Hungarian Notation. Control Flow with discussion on structured and unstructured programming: Statements and Blocks, If-Else-If, Switch, Loops – while, do, for, break and continue, goto labels, structured and un-structured programming.

Unit – 3 Functions and Program Structure with discussion on standard library: Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Pre-processor, Standard Library Functions and return types.

Unit – 4 Pointers and Arrays: Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialisation of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.

Unit – 5 Structures: Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral structures, Table look up, typedef, unions, Bit-fields. Input and Output: Standard I/O, Formatted Output – printf, Formated Input – scanf, Variable length argument list, file access including FILE structure, fopen, stdin, sdtout and stderr, Error Handling including exit, perror and error.h, Line I/O, related miscellaneous functions.

Unix system Interface: File Descriptor, Low level I/O – read and write, open, create, close and unlink, Random access – lseek, Discussions on Listing Directory, Storage allocator.

Text Books:

1. The C Programming Language, (Second Edition) B. W. Kernighan and D. M. Ritchi, PHI.
2. Programming in C, (Second Edition) B. Gottfried, Schaum Outline Series.

Reference Books:

1. C: The Complete Reference, (Fourth Edition), Herbert Schildt, McGraw Hill.
2. Let Us C, Yashavant Kanetkar, BPB Publications.

Subject Code EE102104	PRINCIPLES OF ELECTRICAL ENGINEERING	L = 2	T = 1	P = 0	Credits = 2
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes

Unit – 1 Introduction: Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Terminology and symbols in order to describe electric networks, voltage source and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchhoff-s laws and applications to network solutions using mesh and nodal analysis, Concept of work, power, energy, and conversion of energy.

Unit – 2 DC Circuits: Current-voltage relations of the electric network by mathematical equations to analyze the network (Thevenin's theorem, Norton's Theorem, Maximum Power Transfer theorem) Simplifications of networks using series-parallel, Star/Delta transformation. Superposition theorem.

Unit – 3 AC Circuits: AC waveform definitions, form factor, peak factor, study of R-L, R-C,RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits (人-Δ & 人-人).

Unit – 4 Electrostatics and Electro-Mechanics: Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors, Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion.

Unit – 5 Measurements and Sensors: Introduction to measuring devices/sensors and transducers (Piezoelectric and thermo-couple) related to electrical signals, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-phase power). Electrical Wiring and Illumination system: Basic layout of the distribution system, Types of Wiring System &Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices & system.

For Further Reading - Principle of batteries, types, construction and application, Magnetic material and B-H Curve, Basic concept of indicating and integrating instruments.

Text Books:

1. Electric Machinery, (Sixth Edition) A. E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, Tata McGraw Hill.
2. A Textbook of Electrical Technology, (vol. I), B. L. Theraja, Chand and Company Ltd., New Delhi.
3. Basic Electrical Engineering, V. K. Mehta, S. Chand and Company Ltd., New Delhi.
4. Theory and problems of Basic Electrical Engineering, (Second Edition), J. Nagrath and Kothari, Prentice Hall of India Pvt. Ltd.

Reference Books:

1. Basic of Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press.

T. K. Nagsarkar and M. S. Sukhija, Basic of Electrical Engineering, Oxford University Press, 2011.

2. Introduction to Electrodynamics, D. J. Griffiths, (Fourth Edition), Cambridge University Press.
3. Engineering Circuit Analysis, William H. Hayt & Jack E. Kemmerly, McGraw-Hill Book Company Inc.
4. Fundamentals of Electrical and Electronics Engineering, Smarjith Ghosh, Prentice Hall (India) Pvt. Ltd.

Subject Code AP102105	PHYSICS FOR COMPUTING SCIENCE	L = 2	T = 1	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes

Unit – 1 Oscillation: Periodic motion-simple harmonic motion-characteristics of simple harmonic motion-vibration of simple spring mass system. Resonance-definition., damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators.
Interference-principle of superposition-young's experiment: Theory of interference fringes-types of interference-Fresnel's prism-Newton's rings, Diffraction-Two kinds of diffraction-Difference between interference and diffraction-Fresnel's half period zone and zone plate-Fraunhofer diffraction at single slit-plane diffraction grating. Temporal and Spatial Coherence.

Unit -2 Polarization of light: Polarization - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction.
Basic Idea of Electromagnetisms: Continuity equation for current densities, Maxwell's equation in vacuum and non-conducting medium.

Unit – 3 Quantum Mechanics: Introduction - Planck's quantum theory- Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box, Heisenberg Picture.

Unit -4 Crystallography: Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Atomic packing factor for SC, BCC, FCC and HCP structures.
Semiconductor Physics: Conductor, Semiconductor and Insulator; Basic concept of Band theory.
Thermodynamics: Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes.

Unit -5 Laser and Fiber optics: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in engineering. Fiber optics and Applications, Types of optical fibers.

Text Books:

1. Concepts of Modern Physics, (Fifth Edition) A Beiser, McGraw Hill International.
2. Fundamentals of Physics, David Halliday, Robert Resnick and Jearl Walker, Wileyplus.

Reference Books:

1. Optics, (Fifth Edition) Ajoy Ghatak, Tata McGraw Hill.
2. Sears & Zemansky University Physics, Addison-Wesley.
3. Fundamentals of Optics, (Third Edition) Jenkins and White, McGraw-Hill.

Subject Code HM102106	Business Communication & Value Science - I	L = 2	T = 1	P = 0	Credits = 2
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
The purpose of the course is to help and encourage the learners to actively participate through listening techniques and to understand and apply the key concepts of values of life skills and business communication . It also helps the learners to look within and create a better version of self. Further it also helps the learners to develop career skills like working collaboratively, observing business etiquette and employing ethical tools	CO1 : Apply the basic concept of basic LSRW skills. CO2 : Apply & Comprehend conversations and talks presented in English. CO3: Apply & Recognize the need for life skills and values CO4: Apply & Recognize own strengths and opportunities. CO5: Apply the life skills to different situations & Understand the basic tenets of communication.

Unit - I Leadership Oriented Learning (Lol) : Life Skills And Values : Concept Of Life Skills, Types Of Skills & Its Importance In Day To Day Life. Difference Between Life Skills & Life Values. Ten Core Basic Life Skills Self Awareness : Self Awareness : Definition, Types Of Self- Awareness, Important Self- Awareness Skills, Benefits Of Self Awareness, Ten Tips Towards Improving Self- Awareness & Importance Of Self Awareness In Leadership Role. Report Writing : Format Of Newspaper Report Writing, Key Elements Of News Paper Report Writing.

Unit - II Writing & Language Development Key Concepts In Communication : Process Of Communication, Effective Communication (Principles Of Communication) , Barriers Of Communication, Types Of Communication (Verbal & Non-Verbal Communication) Advantages & Dis-Advantages Of Oral & Written Communication ,Role Play, Four Different Types Of Role Play, Do's & Don'ts Of Role Play, Importance Of Questioning. Listening Skills : Importance Of Listening, Types Of Listening, Difference Between Hearing & Listening, Barriers To Listening. Grammar: Parts Of Speech, Tenses, Articles , Subject Verb Agreement

Unit - III Vocabulary Building Pronunciation, Importance Of Pronunciation. Clarity Of Speech, Sentence Formation, Common Errors, Idioms : Think Outside The Box, Not Going To Fly, When It Rains It Pours, On The Same Page, Don’t Put All Your Eggs In One Basket, Land On Your Feet, Take The Bull By The Ho

rns, Jump The Gun, Throw In The Towel, Miss The Mark, To Stay On Your Toes, Stab Someone In The Back, Raise The Bar, Back To The Quare One Phrases : To Bank On Someone/Something, Bring To The Table, Hit The Ceiling, Speak Of The Devil, To Think Outside The Box, A Hard Nut To Crack, A Piece Of Cake, Born With A Silver Spoon In The Mouth, Bread And Butter, Break The Ice, Break A Leg, Cant Judge A Book By Its Cover , Formal & Informal E-Mail Writing

Unit - IV Language Development & Interpersonal Skills : Group Discussions, Do's & Don’ts Of G.D, Stress Management: Definition, Identidying The Signs Of Stress, Seven Steps To Protect Yourself From Stress Tips For Reducing Stress,

Unit - V Written Communication: Summary Writing - Procedure & Rules Of Summary Writing, Basic Steps In Writing A Summary. Story Writing: Definition, Main Elements Of A Story Writing. Building Curriculum Vitae, Do's & Don'ts Of C.V. Writing.

Text Books:

There are no prescribed texts for Semester 1 – there will be handouts and reference links shared.

Reference Books:

1 English vocabulary in use – Alan Mc’carthy and O’dell
2 APAART: Speak Well 1 (English language and communication)
3 APAART: Speak Well 2 (Soft Skills)
4 Business Communication – Dr. Saroj Hiremath

Subject Code CS102191	FUNDAMENTALS OF COMPUTER SCIENCE Lab	L = 2	T = 1	P = 0	Credits = 1
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	40	-	20	60	-
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes

Laboratory

1. Algorithm and flowcharts of small problems like GCD
2. Structured code writing with:
    i. Small but tricky codes
    ii. Proper parameter passing
    iii. Command line Arguments
    iv. Variable parameter
    v. Pointer to functions
    vi. User defined header
    vii. Make file utility
    viii. Multi file program and user defined libraries
    ix. Interesting substring matching / searching programs
    x. Parsing related assignments

Text Books:

1. *The C Programming Language*, (Second Edition) B. W. Kernighan and D. M. Ritchi, PHI.
2. *Programming in C,* (Second Edition) B. Gottfried, Schaum Outline Series.

Reference Books:

1. *C: The Complete Reference*, (Fourth Edition), Herbert Schildt, McGraw Hill.
2. *Let Us C,* Yashavant Kanetkar, BPB Publications.

Subject Code EE102192	PRINCIPLES OF ELECTRICAL ENGINEERING Lab	L = 2	T = 1	P = 0	Credits = 1
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	40	-	20	60	-
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes

Laboratory

1. Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits
2. Determination of resistance temperature coefficient
3. Verification of Network Theorem (Superposition, Thevenin, Norton, Maximum Power
4. Transfer theorem)
5. Simulation of R-L-C series circuits for XL>XC , XL< XC
6. Simulation of Time response of RC circuit
7. Verification of relation in between voltage and current in three phase balanced star and delta connected loads.
8. Demonstration of measurement of electrical quantities in DC and AC systems.

Text Books:

1. Electric Machinery, (Sixth Edition) A. E. Fitzgerald, Kingsely Jr Charles, D. Umans Stephen, Tata McGraw Hill.
2. A Textbook of Electrical Technology, (vol. I), B. L. Theraja, Chand and Company Ltd., New Delhi.
3. Basic Electrical Engineering, V. K. Mehta, S. Chand and Company Ltd., New Delhi.
4. Theory and problems of Basic Electrical Engineering, (Second Edition), J. Nagrath and Kothari, Prentice Hall of India Pvt. Ltd.

Reference Books:

1. Basic of Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press.
2. Introduction to Electrodynamics, D. J. Griffiths, (Fourth Edition), Cambridge University Press.
3. Engineering Circuit Analysis, William H. Hayt & Jack E. Kemmerly, McGraw-Hill Book Company Inc.
4. *Fundamentals of Electrical and Electronics Engineering*, Smarjith Ghosh, Prentice Hall (India) Pvt. Ltd.

Subject Code APT102193	PHYSICS FOR COMPUTING SCIENCE Lab	L = 2	T = 1	P = 0	Credits = 1
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	40	-	20	60	-
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes

Laboratory

1) Magnetic field along the axis of current carrying coil – Stewart and Gee
2) Determination of Hall coefficient of semi-conductor
3) Determination of Plank constant
4) Determination of wave length of light by Laser diffraction method
5) Determination of wave length of light by Newton's Ring method
6) Determination of laser and optical fiber parameters
7) Determination of Stefan's Constant.

Text Books:

1. Concepts of Modern Physics, (Fifth Edition) A Beiser, McGraw Hill International.
2. Fundamentals of Physics, David Halliday, Robert Resnick and Jearl Walker, Wileyplus.

Reference Books:

1. Optics, (Fifth Edition) Ajoy Ghatak, Tata McGraw Hill.
2. Sears & Zemansky University Physics, Addison-Wesley.
3. Fundamentals of Optics, (Third Edition) Jenkins and White, McGraw-Hill.

Subject Code HM102194	PHYSICS FOR COMPUTING SCIENCE Lab	L = 2	T = 1	P = 0	Credits = 1
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	40	-	20	60	-
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	
Course Objectives		Course Outcomes			

Laboratory

Subject Code HM102195	Induction Program	L = 2	T = 1	P = 0	Non Credits
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	-	-	10	10	-