COMPUTER SCIENCE AND BUSINESS SYSTEMS (CSBS)
FOUR YEAR B.TECH. DEGREE COURSE
Scheme of Instruction and Examination

I SEM CSBS **Scheme-2020**

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P	End Exam Marks	CIA Marks	Total Marks
I		**Theory**							
1.	BSC	Introductory topics in Statistics, Probability and Calculus	3	2	1	-	60	40	100
2.	BSC	Engineering Physics	3	3	-	-	60	40	100
3.	ESC	Principles of Electrical Engineering	3	2	-	2	60	40	100
4.	ESC	Discrete Mathematics	3	3	-	-	60	40	100
5.	ESC	Fundamentals of Computer Science and Programming	3	3	-	-	60	40	100
6	Audit	English Proficiency Course				3	-	-	-
II		**Practical**							
7	BSL	Engineering Physics Lab	1.5	-	-	3	60	40	100
8	HSSL	Business Communication & Value Science - I	1.5	-	-	3	60	40	100
9	ESL	Fundamentals of Computer Science and Programming Lab	1.5	-	-	3	60	40	100
		Total	**19.5**						

II SEM CSBS **Scheme-2020**

S. No	Category	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T	P	End Exam Marks	CIA Marks	Total Marks
I		**Theory**							
1.	BSC	Linear Algebra	3	2	1	-	60	40	100
2.	BSC	Statistical Methods	3	2	1	-	60	40	100
3.	HSSC	Fundamentals of Economics	3	3		-	60	40	100
4.	ESC	Principles of Electronics Engineering	3	2		2	60	40	100
5.	ESC	Data Structures & Algorithms	3	3		-	60	40	100
6	MC	Environmental Sciences		2	-		-	100	100
II		**Practical**							
7	BSL	Statistical Methods Lab	1.5	-	-	3	60	40	100
8	HSSL	Business Communication & Value Science - II	1.5	-	-	3	60	40	100
9	ESL	Data Structures & Algorithms Lab	1.5	-	-	3	60	40	100
		Total	**19.5**						

INTRODUCTORY TOPICS IN STATISTICS, PROBABILTY AND CALCULUS (ITSPC)

I Semester : CSBS						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS103	BSC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	-	3	40	60	100
Sessional Exam Duration : 1 ½ Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course the student will be able to

CO1: Understand the basic concepts of statistics.

CO2: Calculate the descriptive measures and frequency distributions.

CO3: Understand the basic concepts of probability and random variables.

CO4: Identify the suitable probability distribution in the field of Engineering and Data Science.

CO5: Find the areas and volumes by multiple integrals.

UNIT – I

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. Classification and tabulation of univariate data, graphical representation, Frequency curves.

UNIT – II

Descriptive Statistics: Descriptive measures - central tendency (mean, median and mode) and dispersion. Moments (first four moments) Bivariate data, Summarization, marginal and conditional frequency distribution.

UNIT – III

Basic Probability And Mathematical Expectation: Concept of experiments, sample space, event, Definition of Combinatorial Probability. Conditional Probability, Baye's Theorem. Discrete and continuous random variables, Expected values and moments: mathematical expectation and its properties, Moments (including variance) and their properties, interpretation, Moment generating function.

UNIT – IV

Probability Distributions: Discrete distributions: Binomial, Poisson and Geometric distribution. Continuous distributions: Uniform, Exponential, Normal, Chi-square, t and F distributions.

UNIT – V

Calculus: Limit, continuity and derivative of functions (Definitions only), Multiple Integrals- double integrals, change of order of integration. Applications of double integrals: Area by double integrals.

Text Books

1. Fundamentals of Statistics, Vol. I & II, A. Goon, M. Gupta and B. Dasgupta, World Press, 2016.
2. Introduction of Probability Models, S. M. Ross, 11th Edition, Academic Press, N.Y., 2014.
3. Higher Engineering Mathematics, B. S. Grewal, 43rd Edition, Khanna, 2015.

Reference Books

1. Probability and Statistics for Engineers (4th Edition), I. R. Miller, J.E. Freund and R. Johnson, PHI.
2. Introduction to the Theory of Statistics , A. M. Mood, F.A. Graybill and D.C. Boes, McGraw Hill Education.
3. A First Course in Probability, S.M Rose, Prentice Hall.
4. Advanced Engineering Mathematics (7th Edition), Peter V. O'Neil, Thomson learning.
5. Advanced Engineering Mathematics (2nd Edition), M.D. Greenberg, Pearson Education.
6. Applied Mathematics, Vol. I & II , P. N. Wartikar and J. N. Wartikar, Vidyarthi Prakashan.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

ENGINEERING PHYSICS (EP)

I Semester : **CSBS**						Scheme: **2020**		
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
BS111	BSC	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Sessional Exam Duration : 1 ½ Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes : At the end of the course students will be able to

CO1 : Understand the concepts of free, damped and forced oscillations. Apply the theory to mechanical and electrical oscillators. Understand the different crystal structures to find few important crystal parameters.

CO2 : Understand the phenomenon of interference, diffraction and polarization of light.

CO3 : Understand different production methods of lasers and their applications, different types of optical fibres and applications of optical fibres.

CO4 : Understand the principles of Electromagnetic waves by studying the Maxwell's equations. Study the quantum mechanical behaviour of a particle

CO5 : Study the basic concept of band theory to distinguish the materials as conductors, semiconductors and insulators. Study the basic thermodynamic laws

UNIT – I

Oscillation: Periodic motion-simple harmonic motion-characteristics of simple harmonic motion-vibration of simple spring mass system, damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced oscillator- Resonance-Applications to mechanical and electrical oscillators.

Crystallography: Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Atomic packing factor for SC, BCC, FCC structures.

UNIT – II

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-Fraunhofer diffraction at single slit-plane diffraction grating. Temporal and Spatial Coherence.

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.

UNIT – III

Lasers: Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, He-Ne Laser, CO_2 and Nd-YAG lasers; Properties of laser beams: mono-chromaticity, coherence, directionality and brightness, laser speckles, applications of lasers in engineering.

Fiber optics: Principle and propagation of light in optical fibres, Acceptance angle, Numerical Aperture (NA), Structure and types of optical fibres- Applications: Fibre optic communication, fibre optic sensors.

UNIT – IV

Basic Idea of Electromagnetic waves: Basic laws of electricity and magnetism-Continuity equation for current densities, Maxwell's equation in vacuum and non-conducting medium.

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.

UNIT – V

Semiconductor Physics: Basic concept of Band theory, Conductor, Semiconductor and Insulator; Extrinsic and intrinsic semiconductors-compound semiconductors.

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.

Text Books :

1. M.N.Avadhanulu and P.G.Kshirsagar, A text Book of Engineering Physics, S. Chand & Company
2. V.Rajendran, Engineering Physics, McGraw Hill Education (India) Pvt Limited.
3. Gaur & Gupta, Engineering Physics, Dhanpat rai & Sons
4. S. L. Gupta & S. G. Gupta, Unified Physics (vol 1) –Waves and Oscillations, Jai Prakash Nath Publications, Meerut
5. Heat and Thermodynamics by Brijlal and Subrahmanyam, S. Chand & company.
6. S. L. Gupta & S.G. Gupta, Unified Physics (vol 3) –Electricity, Magnetism and Electronics, Jai Prakash Nath Publications, Meerut

Reference Books :

1. Hitendra K. Malik & A.K. Singh, Engineering Physics, Tata McGraw Hill Education Pvt. Ltd.
2. P.K Palaniswamy, Engineering Physics, SCITECH Publications (India) Pvt Ltd.
3. Halliday & Resnick, Physics Vol 1 & 2, John Wiley & Sons (Asia) Pvt Ltd
4. R. Murugashan and Er.K.Siva Prasanth, Modern Physics, S. Chand & Company
5. Briz lal and Subrahmanyam, Waves and Oscillations, S. Chand & company.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

PRINCIPLES OF ELECTRICAL ENGINEERING (PEEG)

<table>
<tr><td colspan="5">I Semester : CSBS</td><td colspan="4">Scheme : 2020</td></tr>
<tr><td rowspan="2">Course Code</td><td rowspan="2">Category</td><td colspan="3" rowspan="2">Hours/Week</td><td rowspan="2">Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">Continuous Internal Assessment</td><td rowspan="2">End Exam</td><td rowspan="2">TOTAL</td></tr>
<tr><td rowspan="2">EE102</td><td rowspan="2">ESC</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>2</td><td>0</td><td>2</td><td>3</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="5">Sessional Exam Duration : 1 ½ Hrs</td><td colspan="4">End Exam Duration: 3 Hrs</td></tr>
<tr><td colspan="9">Course Outcomes : At the end of the course students will be able to</td></tr>
<tr><td colspan="9">CO1: Understand the basics of DC circuits and apply network theorems to DC circuits.</td></tr>
<tr><td colspan="9">CO2: Understand the basics of single phase and three phase AC circuits.</td></tr>
<tr><td colspan="9">CO3: Understand the basics of static electric and magnetic fields and its applications (capacitors and transformers).</td></tr>
<tr><td colspan="9">CO4: Understand the operating principles of measuring instruments/sensors.</td></tr>
<tr><td colspan="9">CO5: Understand the basics related to electric wiring, earthing and batteries.</td></tr>
<tr><td colspan="9">UNIT – I</td></tr>
<tr><td colspan="9">DC Circuits: Concept of potential difference, voltage, current, work, power and energy, conversion of energy, Fundamental linear passive and active elements to their functional current – voltage relation, Terminology and symbols in order to describe electric networks, voltage and current sources, ideal and practical sources, concept of dependent and independent sources, Kirchoff’s laws, Simplifications of networks using series-parallel, star-delta transformation and applications to network solutions using mesh and nodal analysis, simple problems only.
Current-voltage relations of the electric network by mathematical equations to analyze the networks, Thevenin’s theorem, Norton's theorem, Maximum Power Transfer theorem and Superposition theorem (Problems with Independent sources only).</td></tr>
<tr><td colspan="9">UNIT – II</td></tr>
<tr><td colspan="9">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 (Δ - Δ & Y – Y), relation between line and phase voltages and currents, simple numerical problems only.</td></tr>
<tr><td colspan="9">UNIT – III</td></tr>
<tr><td colspan="9">Electrostatics and Electro-Mechanics: Electrostatic field, electric field strength, concept of permittivity in dielectrics, composite capacitors, 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, magnetic material and B-H Curve (Elementary treatment only), Electromechanical energy conversion, simple problems.
Single phase Transformer: Principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation (Elementary treatment only).</td></tr>
<tr><td colspan="9">UNIT – IV</td></tr>
<tr><td colspan="9">Measurements and Sensors: Introduction to measuring devices/sensors related to electrical signals, Basic concept of indicating and integrating instruments and Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-phase power).</td></tr>
</table>

UNIT – V

Electrical Wiring: Basic layout of the distribution system, types of wiring system & wiring accessories (Elementary treatment only).
Earthing: Necessity of earthing, types of earthing, safety devices & system (Elementary treatment only).
Batteries: Principle of batteries, types, construction and application (Elementary treatment only).

Text Books :

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

Reference Books :

1. T. K. Nagsarkar and M. S. Sukhija, " Basic of Electrical Engineering", Oxford University Press, 2011.
2. D. J. Griffiths, "Introduction to Electrodynamics", Cambridge University Press, (Fourth Edition).
3. William H. Hayt& Jack E. Kemmerly, "Engineering Circuit Analysis", McGraw-Hill Book Company Inc.
4. Smarjith Ghosh, "Fundamentals of Electrical and Electronics Engineering", Prentice Hall (India) Pvt. Ltd.

Web References:

1. http://nptel.ac.in/downloads/108105053/
2. https://www.electrical4u.com/
3. http://www.smps.us/references.html
4. https://www.facstaff.bucknell.edu/mastascu/eLessonsHTML/EEIndex.html

E-Text Books:

1. http://bookboon.com/en/electrical-electronic-engineering-ebooks
2. http://www.freeengineeringbooks.com/Electrical/Basic-Electrical-Engineering.php

Question Paper Pattern:

Sessional Exam :

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End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

PRINCIPLES OF ELECTRICAL ENGINEERING LAB

LIST OF EXPERIMENTS
NOTE: A minimum of eight experiments should be conducted.
1. Measurement of electrical quantities in DC and AC systems.
2. Verification of KCL & KVL for a given electrical circuit.
3. Verification of Superposition Theorem.
4. Verification of Thevenin‘s Theorem.
5. Verification of Norton‘s Theorem.
6. Verification of Maximum Power Transfer Theorem.
7. Determination of Self & Mutual Inductance.
8. Time response of an RC circuit through simulation.
9. Determination of temperature coefficient of resistance.
10. Load test on single phase transformer.
11. Measurement of Earth resistance.
12. Measurement of humidity using humidity sensor (DHT11/DHT22)

DISCRETE MATHEMATICS (DM)

I Semester : CSBS						Scheme: 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS102	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	0	3	40	60	100
Sessional Exam Duration: 1 ½ Hrs						End Exam Duration : 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand characteristics of Sets, Groups, Rings and Fields

CO2: Understand the concepts of tautology, contradiction and normal forms.

CO3: Illustrate the usage of Boolean algebra and canonical forms.

CO4: Apply combinatorics and recurrence relations for solving problems.

CO5: Understand the graph theory concepts to solve a given problem.

UNIT– I

Abstract Algebra: Set: Finite sets, Power sets, Set Operations, Relations: Types of relations, Groups, Ring: Types of rings, Field

UNIT– II

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: DNF, CNF.

UNIT– III

Boolean algebra: Introduction of Boolean algebra, truth table, basic logic gate, basic postulates of Boolean algebra, principle of duality, canonical form: Principle Disjunctive Normal Form, Principle Conjunctive Normal Form.

UNIT– IV

Combinatorics: Basic counting, balls and bins problems, Generating Functions: Predefined functions, Calculating co-efficient of generating functions, Recurrence Relations: First Order Linear Recurrence Relation.

UNIT– V

Graph Theory: Graphs and digraphs, Planar graphs, complement, isomorphism, connectedness and reachability, adjacency matrix, Euler's formula, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs and tournaments, chromatic number.

Text Books :

1. Topics in Algebra, I. N. Herstein, 2nd Edition, John Wiley and Sons, 1975.
2. Digital Logic & Computer Design, M. Morris Mano, 2nd Edition,Pearson, 2017.

3. Elements of Discrete Mathematics, C. L. Liu, 2nd Edition, McGraw Hill, New Delhi, 1985.

4. Graph Theory with Applications, J. A. Bondy and U. S. R. Murty, 2nd Edition, Macmillan Press, London, 1978.

5. Mathematical Logic for Computer Science, L. Zhongwan, 2nd Edition, World Scientific, Singapore, 1998

Reference Books :

1. Introduction to Linear Algebra. Gilbert Strang, 5th Edition, Wellesley, 2017.

2. Introductory Combinatorics, R. A. Brualdi, North-Holland, New York, 3rd Edition, Prentice Hall, 1998.

3.Graph Theory with Applications to Engineering and Computer Science, N. Deo, Prentice Hall, Englewood Cliffs, 1974.

4. Data Structures and Algorithms, GAV Pai, Tata McGraw Hill Publications, 2008.

5. Introduction to Mathematical Logic,(Second Edition), E. Mendelsohn, Van-Nostrand, London.

6. Discrete Mathematical Structures With Applications To Computer Science by Jean-Paul ,Tremblay R Manohar , Tata McGraw Hill Publications, 2017.

Question Paper Pattern :

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

FUNDAMENTALS OF COMPUTER SCIENCE AND PROGRAMMING (FCSP)

I Semester: CSBS						Scheme: 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS103	ESC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration : 1 ½ Hrs						End Exam Duration : 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the concepts of algorithm, flow chart, various data types and operators .

CO2: Apply conditional and iterative statements for solving a given problem

CO3: Illustrate the applications of functions.

CO4: Understand the concepts of arrays, pointers, structures and unions

CO5: Understand low level and high level File I/O functions.

UNIT– I

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) – Types, Operators and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Types and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment and Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, proper variable naming and Hungarian Notation

UNIT– II

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– III

Arrays, Functions and Program Structure with Discussion on Standard Library: Introduction to Arrays. 1D –Arrays, 2D-Arrays, String Handling Functions. 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– IV

Pointers, Arrays and Structures: Pointers and addresses, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, Character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Command line arguments, Pointer to functions, Complicated declarations and how they are evaluated. Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral Structures, Table look up, typedef, Unions, Bit-fields

UNIT– V

Input and Output, Unix System Interface, Programming Method: Standard I/O, Formatted Output – printf, Formatted 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. File Descriptor, Low level I/O – read and write, Open, create, close and unlink.

Text Books :

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

Reference Books :

1. C: The Complete Reference, Herbert Schildt, Fourth Edition, McGraw Hill.
2. Let Us C, YashavantKanetkar, BPB Publications.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

ENGINEERING PHYSICS LAB (EP(P))

I Semester : CSBS					Scheme : 2020			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS115	BSL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	3	1.5	40	60	100

End Exam Duration: 2 Hrs

Course Outcomes : At the end of the course students will be able to

CO1: apply the knowledge of physics laboratory in measuring the standard values.

CO2: apply theoretical knowledge to experimental values.

List of Experiments

Note : At least 12 of the following experiments shall be conducted

1. Determination of size of small particles using a laser.
2. B-H curve to study the magnetic behavior of ferromagnetic materials.
3. Determination of Numerical Aperture of an Optical Fiber.
4. Verification of Faraday's Laws.
5. Determination of wavelength of light by Laser diffraction Method..
6. Study of magnetic field along the axis of a circular coil -Steward Gees Apparatus.
7. LCR Series and Parallel Resonance.
8. Determination of wavelengths using a grating.
9. Hall Effect-determination of Hall coefficient and charge density of semiconductor.
10. Determination of wavelength of light using Newton's rings.
11. Double refraction - determination of refractive indices of e-ray and o-ray.
12. Determination of small thickness by forming parallel fringes.
13. Determination of rigidity modulus by using torsion pendulum.
14. Determination of Stefan's Constant.
15. Determination of Plank Constant

BUSINESS COMMUNICATION & VALUE SCIENCE – I (BCVS-I)

I Semester : CSBS						Scheme : 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
HU104	HSSL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		-	-	3	1.5	40	60	100

End Exam Duration: 3 Hrs.

Leadership Oriented Learning (LOL)

Nature of Course: Behavioral

Pre-Requisites: Basic Knowledge of high school English.

Course Outcomes: At the end of the course students will be able to

CO 1: Recognize the need for life skills and values.

CO 2: Recognize own strengths and opportunities.

CO 3: Apply the life skills to different situations.

CO 4: Understand the basic tenets of communication.

CO 5: Apply the basic communication practices in different types of communication.

UNIT – I

Overview of Leadership Oriented Learning (LOL):

i) Self – introduction (Activity based Learning)
ii) Recognize the need of life Skills and Values (Activity based Learning)
iii) **Self-work with immersion -** interview a maid,. watchman, sweeper etc.,
iv) **Overview of Business Communication**
v) **Self-awareness -** identity, body awareness and Stress- Management (Anubhaav activity)

Written Communication: Report writing – Newspaper report

UNIT – II

Essential Grammar – I:

i) Parts of speech
ii) Tenses
iii) Sentence Formation (General & technical)
iv) Common errors
v) Voices

Communication Skills:

i) Overview of Communication Skills, Barriers of communication and Effective communication
ii) **Types of communication**- verbal and non - verbal (Role-play based learning)
iii) **Importance of Questioning**
iv) **Listening Skills:** Law of nature- Importance of listening skills, Difference between listening and hearing; Types of listening (Activity based Learning)
v) **Expressing self:** Connecting emotions, visualization and experiencing purpose (Anubhaav activity).
vi) **Evaluation on Listening Skills**

UNIT – III

i) **Email Writing** –Formal and Informal Email writing (Activity based Learning).
ii) **Verbal Communication:** Pronunciation and Clarity of Speech (Audio and Video based Learning).
iii) **Vocabulary enrichment:** Exposure to words from General Service List (GSL) by West, Academic word list (AWL) technical specific terms related to the field of technology, phrases, idioms, significant abbreviations formal business vocabulary (Activity based Learning - GD).
iv) **Written Communication:** Summary writing and Story Writing (Activity based Learning).
v) **Build your Curriculum Vitae.**
vi) **Life Skill:** Stress management - Working with rhythm and balance, Colors and Team work (Anubhaav activity).

UNIT – IV

i) **Understanding Life Skills** – Movie based learning (Interactive Learning)

ii) **Introduction to life skills** – critical Life Skills (Activity and video based)

iii) **Multiple Intelligences- Embracing diversity** (Video and activity based)

iv) **Life Skill** – Community service - work with an NGO (Field work)

v) **Life Skill** – **Join a trek**: Values to be learnt: Leadership, Teamwork, dealing with ambiguity, motivation, creativity, result orientation (Field work).

Text Books:

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

Reference Books:

1. *English vocabulary in Use* by Alan McCarthy and O'Dell, Cambridge University Press; 2nd Edition (19 December 2013).
2. *APAART: Speak Well 1* (English language and communication)
3. *APAART: Speak Well 2* (Soft Skills)
4. *Business Communication* by Saroj Hiremath, Nirali Prakashan (19 December 2018).

Web References:

1. **Train your mind to perform under pressure- Simon sinek**
   https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-under-pressure-capture-your-flag/
2. **Brilliant way one CEO rallied his team in the middle of layoffs**
   https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-before-numbers.html
3. **Will Smith's Top Ten rules for success**
   https://www.youtube.com/watch?v=bBsT9omTeh0

Online Resources:

- https://www.coursera.org/learn/learning-how-to-learn
- https://www.coursera.org/specializations/effective-business-communication

FUNDAMENTALS OF COMPUTER SCIENCE AND PROGRAMMING LAB (FCSP(P))

I Semester: CSBS						Scheme: 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS108	ESL	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		0	0	3	1.5	40	60	100

End Exam Duration : 3 Hrs

Course Outcomes: At the end of the course students will be able to

CO1: Develop algorithm and flowchart for specified problem.

CO2: Implement programs using C language constructs

CO3: Implement programs using modular approach and file I/O concepts

CO4: Implement programs using pointers

List of Experiments

1. Algorithms and flowcharts of small problems like GCD
2. Small but tricky codes
3. Proper parameter passing
4. Command line Arguments
5. Variable parameter
6. Pointer to functions
7. User defined header
8. Make file utility
9. Multi file program and user defined libraries
10. Interesting substring matching / searching programs
11. Parsing related assignments.

Text Books :

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

Reference Books :

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

LINEAR ALGEBRA (LA)

II Semester : CSBS						**Scheme : 2020**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
BS107	BSC	**2**	**1**	**-**	**3**	**40**	**60**	**100**
Sessional Exam Duration : 1 ½ Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes : At the end of the course the student will be able to

CO1: Understand basic concepts and rank of matrices.

CO2: Solve the system of linear equations by the tool of matrices.

CO3: Find eigen values and eigen vectors of matrices.

CO4: Understand vector space, Gram-Schmidt Orthogonalization and QR decomposition.

CO5: Apply singular value decomposition in Image Processing and Machine Learning.

UNIT – I

Introduction to Matrices and Determinants, Inverse of a matrix, Vectors and linear combinations. Rank of a matrix- Echelon form and Normal form.

UNIT - II

Solving Systems of Linear Equations using the tools of Matrices - Cramer's rule, Inverse method, Gaussian elimination method, Gaussian Jordan method and LU Decomposition.

UNIT – III

Eigen values and Eigenvectors, Positive definite matrices, linear transformations, Hermitian and unitary matrices.

UNIT - IV

Vector space, Dimension, Basis, Orthogonality, Projections, Gram-Schmidt orthogonalization and QR decomposition

UNIT - V

Singular value decomposition and Principal component analysis, Introduction to their applications in Image Processing and Machine Learning.

Text Books

1. Higher Engineering Mathematics, B. S. Grewal, 43rd Edition, Khanna, 2015.

Reference Books

1. Advanced Engineering Mathematics (7th Edition), Peter V. O'Neil, Cengage Learning.

2. Advanced Engineering Mathematics (2nd Edition), Michael. D. Greenberg, Pearson, 2017..

3. Introduction to Linear Algebra (5th Edition), Gilbert Strang, Wellesley, Cambridge Press.

4. Applied Mathematics (Vol. I & II), P. N. Wartikar & J.N.Wartikar, Pune Vidyarthi Griha Prakashan,

5. Digital Image Processing (4th Edition), R. C. Gonzalez and R. E. Woods, Pearson.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

STATISTICAL METHODS (SM)

II Semester : CSBS						**Scheme : 2020**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
BS108	BSC	**2**	**1**	**-**	**3**	**40**	**60**	**100**
Sessional Exam Duration : 1 ½ Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes : At the end of the course the student will be able to

CO1: Characterize the huge data using sampling techniques.

CO2: Understand estimation and its applications.

CO3: Analyze the test of hypothesis for large and small samples.

CO4: Apply the Non-Parametric tests in field of Engineering and Data Sciences.

CO5: Gain knowledge on correlation, regression, analysis of variance and time series.

UNIT – I

Sampling Techniques: Random sampling. Sampling from finite and infinite populations. Estimates and standard error (sampling with replacement and sampling without replacement), Sampling distribution of sample mean, stratified random sampling.

UNIT - II

Estimation: Point estimation, criteria for good estimates (un–biasedness, consistency), Methods of estimation including maximum likelihood estimation.
Sufficient Statistic: Concept & examples, complete sufficiency, their application in estimation.

UNIT – III

Test of hypothesis: Concept & formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing: Large Samples – Z-test for Means and Proportions. Small Samples –Student t-test, F – test and Chi-square test – Goodness of fit and independence of attributes.

UNIT - IV

Non-parametric Inference: Comparison with parametric inference, Use of order statistics. Sign test, Wilcoxon signed rank test, Mann-Whitney test, Run test, Kolmogorov-Smirnov test. Spearman's and Kendall's test. Tolerance region.

UNIT - V

Linear Statistical Models: Scatter Diagram, linear regression & correlation. Least squares method. Rank Correlation. Multiple regression and multiple correlation, Analysis of variance (one way, two way with as well as without interaction)
Basics of Time Series Analysis & Forecasting: Stationary, ARIMA Models: Identification, Estimation and Forecasting.

Text Books

1. Probability and Statistics for Engineers (4thEdition), I.R.Miller, J.E.Freund and R.Johnson, Prentice Hall India Learning Pvt Ltd.

2. Fundamentals of Statistics (Vol. I & Vol. II), A. Goon, M. Gupta and B. Dasgupta, World Press.
3. The Analysis of Time Series: An Introduction, Chris Chatfield, Chapman & Hall/ CRC

Reference Books

1. Introduction to Linear Regression Analysis, D.C. Montgomery & E. Peck, Wiley-Interscience.
2. Introduction to the Theory of Statistics, A.M. Mood, F.A. Graybill & D.C.Boes, McGraw Hill.
3. Applied Regression Analysis, N. Draper & H.Smith, Wiley-Interscience.
4. Hands-on-Programming with R, Garrett Grolemound, O'Reilly
5. R for Everyone: Advanced Analytics and Graphics, Jared P.Lander, Addison-Wesley Professional.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

FUNDAMENTALS OF ECONOMICS (FEC)

II Semester: CSBS						**Scheme:** 2020		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
HU102	HSSC	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		3	0	0	3	**40**	**60**	**100**
Sessional Exam Duration: 1 ½ Hrs						**End Exam Duration:** 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Explain the theory of the firm and various micro-economics tools such as demand and supply. analysis that would help in forward planning and decision making.

CO2: Understand consumer behaviour and consumer's equilibrium with reference to price, income and demand.

CO3: Summarize production theories, factors of production, various costs and revenue concepts and gain valuable insights into operations of various market structures.

CO4: Classify the components of National income with the help of income determination tools and examine the policies and procedures of Government sector and monetary operations by considering demand and supply of money.

CO5: Compare the existing business cycles and its stabilization considering monetary policies & paradigms which are influencing price-wage rigidities and unemployment.

UNIT– I

Principles of Demand and Supply — Supply Curves of Firms — Elasticity of Supply; Demand Curves of Households — Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve); Welfare Analysis — Consumers' and Producers' Surplus — Price Ceilings and Price Floors

UNIT– II

Consumer Behaviour: Axioms of Choice - Budget Constraints and Indifference Curves; Consumer's Equilibrium — Effects of a Price Change, Income and Substitution Effects —Derivation of a Demand Curve; Applications — Tax and Subsidies — Intertemporal Consumption — Suppliers' Income Effect

UNIT– III

Theory of Production: Production Function and Iso-quants — Cost Minimization; Cost Curves — Total, Average and Marginal Costs — Long Run and Short Run Costs; Equilibrium of a Firm under Perfect Competition; Monopoly and Monopolistic Competition

UNIT– IV

National Income and its Components and Government Sector: GNP, NNP, GDP, NDP; Consumption Function; Simple Keynesian Model of Income Determination and the Keynesian Multiplier; Taxes and Subsidies; Money — Definitions; Demand for Money —Transaction and Speculative Demand; Supply of Money.

UNIT– V

Business Cycles and Stabilization: Monetary and Fiscal Policy — Central Bank and the Government; The Classical Paradigm — Price and Wage Rigidities — Voluntary and Involuntary Unemployment.

Text Books:

1. Microeconomics, Pindyck, Robert S., and Daniel L. Rubinfeld, 8th Edition, Pearson Education, 2017.

2. Macroeconomics, Dornbusch, Fischer and Startz, 13th Edition, McGraw-Hill, 2018.

3, Economics, Paul Anthony Samuelson, William D. Nordhaus, 19th Edition, McGraw-Hill, 2012.

Reference Books:

1. Intermediate Microeconomics: A Modern Approach, Hal R. Varian, 9th Edition, Springer, 2014.

2. Principles of Macroeconomics, N. Gregory Mankiw, 7th Edition, Cengage India, 2012.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

PRINCIPLES OF ELECTRONICS ENGINEERING (PEC)

II Semester: CSBS						**Scheme: 2020**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
EC102	ESC	2	0	2	3	**40**	**60**	**100**
Sessional Exam Duration: 1 ½ Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes: At the end of the course students will be able to

CO1: Explain the principles of operation and substantiate the applications of various semiconductor devices and rectifier circuits.

CO2: Understand concepts & applications of BJT, FET and MOSFET.

CO3: Analyse the concepts of Feedback amplifiers and their topologies.

CO4: Understand and apply the concepts of OPAMPs and its applications.

CO5: Use several digital IC's in various applications.

UNIT– I

Semiconductors: Crystalline material: Mechanical properties, Energy band theory, Fermi levels; Conductors, Semiconductors & Insulators: electrical properties, band diagrams; Semiconductors: intrinsic & extrinsic, energy band diagram, P and N-type semiconductors, drift & diffusion currents.

Diodes and Diode Circuits: Formation of P-N junction, energy band diagram, formation of depletion zone, built-in-potential, forward and reverse biased P-N junction, V-I characteristics, Linear piecewise model, Junction capacitance, Zener breakdown, Avalanche breakdown, Zener diode and its reverse characteristics. Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, Idea of regulation.

UNIT– II

Bipolar Junction Transistors: Formation of PNP / NPN junctions; transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off, active and saturation mode, transistor action, injection efficiency, base transport factor and current amplification factors; Biasing and Bias stability: calculation of stability factor.

Field Effect Transistors: Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET structure and characteristics, MOSFET structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles.

UNIT– III

Feed Back Amplifier & Oscillators: Feed Back Amplifier : Concept of feedback, Block diagram, feedback factor, open loop gain, loop gain, properties, positive and negative feedback, topologies of feedback amplifier, effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability.Effect of Positive Feedback, instability and Oscillation, Barkhausen Criteria.

UNIT– IV

Operational Amplifiers: Introduction to integrated circuits, operational amplifier and its terminal properties; Application of operational amplifier; Inverting and non-inverting mode of operation, Adders, Subtractors, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator.

UNIT– V

Digital Electronics Fundamentals: Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- map, Logic ICs, half and full adder/subtractor, multiplexers, de-multiplexers, flip-flops, shift registers, counters.

Text Books :

1. Millman's Integrated Electronics, Jacob Millman, Christos Halkias, ChetanParikh, 2nd Edition, TMH, 2010.
2. Op-Amps and Linear ICs, Ramakanth A. Gayakwad, 4th Edition, PHI, 2016.
3. Digital Logic & Computer Design, M. MorrisMano,4th Edition, PHI, 2016.

Reference Books :

1. Electronic Devices and Circuit Theory, Robert L. Boylestad, LouisNashelsky, 11thEdition,Pearson Publishers, 2015.
2. Solid State Electronic Devices, Ben Streetman, Sanjay Banerjee,7thEdition,PHI,2016.
3. Electronic Principle, Albert Paul Malvino, 3rdEdition, TMH,2010.
4. Microelectronics, Jacob Millman, Arvin Grabel, 2ndEdition, TMH, 2000.
5. Electronics Devices and Circuits, S. Salivahanan, N. Suresh Kumar, A.Vallavaraj, 2ndEdition, TMH, 2011.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

PRINCIPLES OF ELECTRONICS ENGINEERING LAB (PEC(P))

List of Experiments
Simulation of any 3 or 4 experiments using open source software
1. Forward and Reverse Bias V-I characteristics of PN junction Diode.
2. V-I characteristics of Zener diode.
3. Full wave rectifier.
4. Characteristics of a BJT under CB configuration.
5. Characteristics of a BJT under CE configuration.
6. JFET characteristics under CS configuration.
7. MOSFET characteristics under CS configuration.
8. Inverting and Non-Inverting amplifiers using IC 741 Op-Amp.
9. Adder, subtractor and comparator using IC 741 Op-Amp.
10. Integrator and Differentiator using IC 741 Op-Amp.
11. Truth table verification of Logic gates.
12. Truth table verification of Half-Adder and Full Adder.
13. Truth table verification of Multiplexer and De-multiplexer

DATA STRUCTURES & ALGORITHMS (DSA)

II Semester: CSBS						Scheme: 2020		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS106	ESC	3	0	0	3	40	60	100
Sessional Exam Duration: 1 ½ Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the basic concepts of algorithms, time and space complexities.

CO2: Understand various linear data structures, sorting and searching techniques

CO3: Illustrate various operations on non-linear data structures

CO4: Understand the concepts of graphs and traversals.

CO5: Illustrate the usage of file accessing methods.

UNIT– I

Basic Terminologies and Introduction to Algorithm & Data Organisation: Algorithm specification, Recursion, Performance analysis, Asymptotic Notation - The Big-O, Omega and Theta notation, Programming Style, Refinement of Coding - Time-Space Trade Off, Testing, Data Abstraction

UNIT– II

Linear Data Structure: Array, Stack, Queue, Linked-list and its types, Various Representations, Operations & Applications of Linear Data Structures

Searching and Sorting on Various Data Structures: Sequential Search, Binary Search, Comparison Trees, Breadth First Search, Depth First Search Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer Sort, Merge Sort, Quick Sort, Heapsort, Introduction to Hashing.

UNIT– III

Non-linear Data Structure: Trees (Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree) and Graphs (Directed, Undirected), Various Representations, Operations & Applications of Non-Linear Data Structures.

UNIT– IV

Graph: Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

UNIT– V

File: Organisation (Sequential, Direct, Indexed Sequential, Hashed) and various types of accessing schemes.

Text Books :

1. Fundamentals of Data Structures, E. Horowitz and S. Sahni, 1977.
2. Data Structures and Algorithms,Alfred V. Aho, John E. Hopperoft, Jeffrey D. UIlman.

Reference Books :

1. The Art of Computer Programming: Volume 1: Fundamental Algorithms, Donald E. Knuth
2. Introduction to Algorithms, Thomas, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.
3. Open Data Structures: An Introduction (Open Paths to Enriched Learning), 31st Edition, Pat Morin.

Question Paper Pattern:

Sessional Exam :

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam.The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Examination:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub-questions. and the student should answer any one question from each unit. Each Question carries 12 marks.

ENVIRONMENTAL SCIENCES (ESC)

II Semester : CSBS						Scheme : 2020		
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
MC102	MC	2	-	-	-	100	-	100

Course Outcomes : At the end of the course students will be able to

CO 1 : Gain a variety of experiences & acquire a basic knowledge about the environment & its allied problems

CO 2 : Interpret the key components in safe guarding the environment

CO 3 : Appraise the quality of environment in order to create a healthy atmosphere

CO 4 : Familiarize with the individual responsibilities towards green revolution

UNIT-I

Introduction and Awareness Activities: Environmental Science: Introduction, Definition, scope and importance.

Small group meetings about: Water management, Generation of less waste, Promotion of recycle use, Impact of Science & Technology on Environment, Avoiding electronic waste.

UNIT-II

Slogan and Poster Making Event: Food waste management**,** Rain water harvesting**,** Climate change**,** Green Power**,** Role of IT in environment and human health**,** Sustainable development.

UNIT-III

Expert Lectures On Environmental Science: Environmental Impact Assessment**,** Industrial waste treatment**,** Organic farming/Vertical gardens/Hydroponics.

UNIT-IV

Cleanliness Drive: Indoor air pollution**,** Vehicular pollution**,** Waste management at home**,** Composting**,** Plastic recycling.

UNIT- V

Case Studies: HPCL disaster in Vizag, Mathura Refinery & Taj Mahal**,** Conservation of Hussain Sagar Lake**,** Green Buildings in India**,** Fluorosis, Ecotourism & its impacts.

Text Books:

1. Environmental Studies, Anubha Kaushik & C. P. Kaushik, 4th Edition, New Age International Publishers.
2. Textbook of Environmental Studies, Deeksha Dave, S. S. Katewa, Cengage Delmar Learning India Pvt., 2012.
3. R. Rajagopalan, Environmental Studies, Oxford University press, Chennai

Reference Books:

1. Environmental Studies for UG Courses, Erach Bharucha, UGC Publications, Delhi, 2004.
2. Introduction to Environmental Science, Y.Anjaneyulu, BS Publications, 2004.

STATISTICAL METHODS LAB (SM(P))

II Semester : CSBS						**Scheme : 2020**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
BS112	BSL	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		0	**0**	**3**	**1.5**	**40**	**60**	**100**
End Exam Duration: 2 Hrs								

Course Outcomes : At the end of the course the student will be able to

CO1: Implement the basic data types and flow control statements in R Language.

CO2: Implement functions, matrices and vectors.

CO3: Apply different file operations and statistical methods for data analysis.

CO4: Implement various visualization techniques

R statistical programming language: Introduction to R, Functions, Control flow and Loops, Working with Vectors and Matrices, Reading in Data, Writing Data, Working with Data, Manipulating Data, Simulation, Linear model, Data Frame, Graphics in R.

List of Experiments

1. Introduction to R- Exploring R, R-Studio Environment and Installation process. Explore the features.
2. Explore the control structures, loops of R and demonstrate with one example under each case.
3. Explore Functions (pre defined and user defined) in R.
4. Working with Vectors and Matrices in R.
5. Importing data from various file formats for data analysis.
6. Exporting data to various file formats.
7. Manipulation of Data as per any statistical problem.
8. Implement various linear models, Regression analysis.
9. Create, access, modify, extract and delete Data Frame in R.
10. Plot various graphs using graphics in R(Histogram, Dot Plots, Bar plots).
11. Plot various graphs using graphics in R(Pie charts, Box Plots, Scatter plots).

Text Books

1. Probability and Statistics for Engineers (Fourth Edition), I.R. Miller, J.E. Freund and R. Johnson; Prentice Hall India Learning Private Limited.
2. Fundamentals of Statistics (vol. I & vol. II), A. Goon, M. Gupta and B. Dasgupta, World Press
3. The Analysis of Time Series: An Introduction, Chris Chatfield, Chapman & Hall/CRC

Reference Books

1. Introduction to Linear Regression Analysis, D.C. Montgomery and E. Peck, Wiley-Inter science.
2. Introduction to the Theory of Statistics, A.M. Mood, F. A. Graybill and D.C. Boes, McGraw Hill.
3. Applied Regression Analysis, N. Draper and H. Smith, Wiley- Inter science.
4. Hands-on Programming with R, Garrett Grolemund, O′Reilly.
5. R for Everyone: Advanced Analytics and Graphics, Jared P. Lander, Addison-Wesley Professional.

BUSINESS COMMUNICATION & VALUE SCIENCE – II (BCVS-II)

II Semester : CSBS						**Scheme : 2020**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
HU105	HSSL	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		-	**-**	**3**	**1.5**	**40**	**60**	**100**

End Exam Duration: 3 Hrs.

Leadership Oriented Learning (LOL)

Nature of Course: Behavioral

Pre-Requisites:
Basic Knowledge of English (verbal and written), Completion of all units from Semester 1

Course Outcomes: At the end of the course students will be able to

CO 1: Understand using the tools of syntactic written communication.

CO 2: Use electronic/social media to share and argue over the basic concepts - ideas of Morality, Diversity, Inclusion for framing an identity for an organization devoted to a social cause.

CO 3: Identify the strategies of Speed reading - Skimming and Scanning to comprehend the content which aids in vocalizing opinions on a topic with the objective of influencing others.

CO 4: Analyze and assess the presentations, individually and in a team by using the personality traits with apt techniques supporting the concepts of Diversity & inclusion.

CO 5: Create communication materials to share concepts, ideas by applying all the techniques in organizing an event to create awareness for supporting a cause.

UNIT – I

Written Communication

a. Identification of common errors in written communication and ways of rectification
b. Application of writing skills – Resume, Story Writing, Report Writing, E-magazine, Script for skits, book /film review.
c. Assignment – Assimilation of concepts and present them effectively

UNIT – II

Socio- Technical Communication

a. Experiencing diversity and organizing events to support inclusion
b. Recording of the presentations, interviews, skits on social issues, promotion on social media.
c. Assignment – Assimilation of concepts and present them effectively

UNIT – III

Reading and Oral Presentation

a. Understanding speed reading techniques – Skimming and Scanning
b. Application of reading skills – Research on a book
c. GDs, prepared speeches, debate – oral presentation techniques.
d. Assignment – Assimilation of concepts and present them effectively

UNIT – IV

Understanding the 'self'

a. Analysing personality traits and team player style
b. Understanding the concepts of Morality, Diversity and Inclusion

c. Application of these concepts – Forming an NGO and related activities.
d. Assignment – Assimilation of concepts and present them effectively

UNIT – V

Material creation

a. Creation of communication material
b. Assignment – Assimilation of concepts and present them effectively

Project-

1) Each team to look for an NGO/ social group in the city which is working on the issue their college group is supporting.
2) Spend **a day with the NGO/ social group** to understand exactly how they work and the challenges they face.
3) Render voluntary service to the group for one day
4) Invite the NGO/ social group to address their university students for couple of hours. Plan the entire event, decide a suitable venue in the university, gather audience, invite faculty members etc. (they need to get their plan ratified their professor). Outcome-- Host an interactive session with the NGO spokesperson
5) The groups to present their experience of **a day with the NGO** and inspire students to work for the cause.

Text Books:

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

Reference Books:

1. Guiding Souls: Dialogues on the purpose of life; Dr. A.P.J Abdul Kalam, 2005; Co-author--Arun Tiwari.
2. The Family and the Nation; Dr. A.P.J Abdul Kalam, 2015; Co- author: Acharya Mahapragya.
3. The Scientific India: A twenty First Century Guide to the World around Us; Dr. A.P.J Abdul Kalam, 2011; Co-author- Y.S.Rajan.
4. Forge Your Future: Candid, Forthright, Inspiring; Dr. A.P.J Abdul Kalam, 2014.
5. Abundance: The Future is Better Than You Think; Peter H. Diamandis and Steven Kotler, 21 Feb, 2012; Free Press.
6. Start With Why: How Great Leaders Inspire Everyone to Take Action; Simon Sinek, 6 October 2011; Penguin.
7. Advertising & IMC: Principles and Practice; Sandra Moriarty, Nancy D. Mitchell, William D. Wells, 15 June 2016; Publisher: Pearson Education India.

Web References:

1. ETHICS FUNDAMENTALS AND APPROACHES TO ETHICS https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf
2. A Framework for Making Ethical Decisions https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions
3. Five Basic Approaches to Ethical Decision- http://faculty.winthrop.edu/meelerd/docs/rolos/5_Ethical_Approaches.pdf

Online Resources:
1. https://youtu.be/CsaTslhSDI
2. https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M
3. https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y
4. https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be
5. https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu.be

DATA STRUCTURES & ALGORITHMS LAB (DSA(P))

II Semester: CSBS						**Scheme: 2020**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS110	ESL	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		0	0	3	1.5	**40**	**60**	**100**

End Exam Duration: **3 Hrs**

Course Outcomes: At the end of the course students will be able to

CO1: Implement operations on various linear data structures

CO2: Implement operations on various Non- linear data structures

CO3: Apply various searching and sorting techniques

CO4: Implement read and write operations on files.

List of Experiments

1. Towers of Hanoi using user defined stacks.
2. Reading, writing, and addition of polynomials.
3. Line editors with line count, word count showing on the screen.
4. Trees with all operations.
5. All graph algorithms.
6 Saving / retrieving non-linear data structure in/from a file.

Text Books :

3. Fundamentals of Data Structures, E. Horowitz and S. Sahni, 1977.
4. Data Structures and Algorithms, Alfred V. Aho, John E. Hopperoft, Jeffrey D. UIlman.

Reference Books :

4. The Art of Computer Programming: Volume 1: Fundamental Algorithms, Donald E. Knuth
5. Introduction to Algorithms, Thomas, H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.
6. Open Data Structures: An Introduction (Open Paths to Enriched Learning), (Thirty First Edition), Pat Morin, UBC Press.