Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Hindi
Course Code	AEC0101[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Foundation core							
Pre-Requisite/s	varn gyan , shabd gyan			**Co-Requisite/s**	lipi , samajdari			
Course Outcomes & Bloom's Level	**CO1-** भारतीय ज्ञान परम्परा सेवि द्यार्थि यर्थि ों को अवगत कराना**(BL1-Remember)** **CO2-** सांस्कृतिक ,एवं राष्ट्रिय एकता।।**(BL3-Apply)** **CO3-** भाषा अध्ययन एवं अध्यापन का उद्देश्य विद्यार्थियों के सर्वांगीण विकास में सहायक है। छात्र जीविकोपार्जन के लक्ष्यों का सहज संधान कर सके । जीविकोपार्जन के लक्ष्यों का सहज संधान कर सके । **(BL2-Understand)** **CO4-** पाठ्यक्रम में व्याकरण ,सामान्य तथा पारम्परिक साहित्य , लेखन परम्परा का बोध करना एवं समग्र व्यक्तित्व का विकास करना है। **(BL3-Apply)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
1	स्वतंत्रता पुकारती {कविता} वाक्य संरचना और अशुद्धियाँ {३ संकलित } जयशंकर प्रसाद वाक्य संरचना और अशुद्धियाँ {३ संकलित } जयशंकर प्रसाद वाक्य संरचना और अशुद्धियाँ {३ संकलित } जयशंकर प्रसाद पुष्प की अभिलाषा२ {कविता}	Audio/Video clips, group discussion, lecture with PPTs, quiz	5
2	१ नमक का दरोगा} { कहानी} ---प्रेमचंद २ एक थे राजा भोज { निबंध } --त्रिभुवननाथ शुक्ल ३ पर्यायवाची , विलोम , एकार्थी ,अनेकार्थी एवं शब्दयुग्म शब्द {संकलित }	Audio/Video clips, group discussion, lecture with ppt, quiz	4
3	} { निबंध } ---स्वा1मी विवेकानंद २ लोकतंत्र एक धर्म है{ निबंध --डॉ सर्वपल्ली राधा कृष्णन ३ नहीं रूकती है नदी --हीरालाल बाछोतिया ४ पल्लवन १ भगवान् बुद्ध	Audio/Video clips, group discussion, lecture with ppt, classroom presentations	5
4	अफसर{ निबंध -शरद जोशी २ हमारी सांस्कृतिक एकता संग्रह में -भारत एक है{ निबंध -रामधारी सिंह दिनकर ३ संक्षेपण {संकलित }	Audio/Video clips, group discussion, lecture with ppt, classroom presentations	4
5	नैतिक मूल्य परिचय एवं वर्गीकरण{ आलेख } --डॉ शशि राय २ आचरण की सभ्यता --सरदार पूर्ण सिंह ३ अंतर्ज्ञान और नैतिक जीवन{लेख --डॉ सर्वपल्ली राधाकृ ४ अप्प दीपोभव {लेख } -स्वामी श्रद्धानन्द	Audio/Video clips, group discussion, lecture with ppt	5

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	hindi bhasha aur naitik mulay
Articles	
References Books	hindi bhasha aur naitik mulay
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	2	-	-	-	-	2	-	-	-	-	-	-
CO2	-	2	-	-	-	2	-	1	-	-	-	-	-	-	-
CO3	2	-	-	1	-	-	-	-	-	2	-	-	-	-	-
CO4	2	-	-	-	-	2	-	-	1	-	-	-	-	-	-
CO5	1	-	-	-	1	-	-	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Programming in C
Course Code	BSCS0101[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Basic knowledge of computer fundamental, algorithm and flowchart			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To Remember the basics of Computer Knowledge.**(BL1-Remember)** **CO2-** To Understand debugging and testing, implementation and maintenance.**(BL2-Understand)** **CO3-** To apply the various techniques for C Programming.**(BL3-Apply)** **CO4-** To analysis modular programming**(BL4-Analyze)** **CO5-** To Evaluate Students will learn to write algorithm for solutions to various real-life problems.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Classification of programming language: procedural languages, problem oriented languages, non-procedural languages, Structured programming concepts: modular programming: top-down analysis, bottom-up analysis, structured programming. Problem solving using computers: problem definition and analysis, problem design, coding, compilation, debugging and testing, documentation, implementation and maintenance.	White Board, Group Discussion	8
2	Introduction to C language: constants, variables, keywords, data types, operators, expressions, operator precedence and associativity. Structure of C program: variable declaration of variable as constant.	White Board, Group Discussion	8
3	Managing input/output operators: formatted and unformatted. Control statements: branching, jumping & looping, scope rules, and storage classes.	White Board, Group Discussion	8
4	Arrays (one and two dimensional), Functions: user defined function, standard function, categories in functions, passing arguments to a function, recursion. Pointers: operators, declaration, pointer to arithmetic, array of pointers. Structures: declaring, accessing, initializing, array of structures.	White Board, Group Discussion	8
5	File handling in C: opening and closing a data file, inserting data to data file. Graphics programming- introduction, functions, stylish lines, drawing and filling images, palettes and colours, justifying text, bit of animation.	White Board, Group Discussion	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Write a program to print digits of entered number in reverse order.	Experiments	BL2-Understand	2
2	Write a program to print sum of two matrices.	Experiments	BL2-Understand	2
3	Write a program to print subtraction of two matrices.	Experiments	BL2-Understand	2
4	Write a program to print multiplication of two matrices	Experiments	BL2-Understand	2
5	Write a program to demonstrate concept of structure.	Experiments	BL2-Understand	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	Let us C by Yashwant Kanetkar ANSI C by Balagurusamy
Articles	
References Books	Introduction to Algorithms by Cormen, PHI Programming in C: Denis Richie
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Basics of Computer and information technology
Course Code	BSCS0102[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Preliminary knowledge of computer, their operations and applications.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To Remember the basics of Computer Knowledge. **(BL1-Remember)** **CO2-** Understand basic concepts and terminology of information technology.**(BL2-Understand)** **CO3-** To apply the various techniques for Basics Computer Knowledge.**(BL3-Apply)** **CO4-** To analysis of MS Ofiice in Windows and other OS.**(BL4-Analyze)** **CO5-** To evaluate the study problem of application programmings by using the different types of Software and solve base problems which arise in all applied sciences.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	INTRODUCTION TO COMPUTER Basic organization of computer system: block diagram & functions (Central Processing Unit, Input / Output Unit, and Storage Unit); Characteristics; Capabilities & Limitations. Types of Computing Devices: Desktop, Laptop & Notebook Smart-Phone, Tablet PC, Server, Workstation & their Types: RAM, ROM, PROM, EPROM, EEPROM; Cache Memory. PERIPHERAL DEVICES Input Devices: Keyboard, Mouse, Trackball, Joystick, Digitizer or Graphic Tablet, Scanners, Digital Camera, Web Camera, MICR, OCR, OMR, Bar-Code Reader, Voice Recognition device, Light Pen & Touch Screen. STORAGE DEVICES Magnetic Tape, cartridge, Data Drives, Hard Disk Drives (Internal & External), Floppy Disk, CD, VCD, CD-RW, Zip Drive, DVD,-RW, USB Flash Drive, Blue Ray Disk & Memory Cards.	White Board, Group Discussion	8
2	OPERATING SYSTEM DOS basics: FAT, File & Directory Structure and naming rules, Booting process, DOS system files, Internal & External DOS Commands. Window Basics (only elementary ides): Windows 7 & 8: Desktop, Control Panel; saving renaming, moving copying and searching files & folders, restoring from recycle Bin, Creating shortcut, Establishing Network Connections.	White Board, Group Discussion	8
3	MS Word Text Editing and formatting using Word 2007 & onwards versions: Creating documents using Template; Saving Word file formats; Previewing documents, Printing document to file/page; Protecting document; Editing of selected text, Inserting, Deleting and Moving text. Formatting documents: page layout, paragraph format, Aligning text and paragraph, Borders and Shading, Headers and Footers.	White Board, Group Discussion	8
4	MS Power point & MS Excel • Creating presentation using slide master and template in various themes & variants. • Working with slides: New slide, move, copy, delete, duplicate, slide layouts, presentation views. • Format menu: Font, paragraph, drawing & Editing. • Printing presentation: Print slides, notes, handouts and outlines. • Saving presentation in different file formats. • Workbook & Worksheet Fundamentals: Concept of Row, Column & Cell; creating a new workbook through blank & template. • Working with worksheet: Entering data into worksheet (General, number, Currency, Data, Time, Text, Accounting, etc.); Renaming, Copying, Inserting, deleting & protecting worksheet. • Working with Row & Column (Inserting, Deleting, Pasting, resizing & Hiding), Cell & Cell formatting, and Concept of range.	White Board, Group Discussion	8

5	Internet and Cyber Security • Internet: World Wide Web, Dial up connectivity, leased line, VSAT, Broad Band, Wi- Fi, URL, Domain name, Web Browser (Internet Explorer, Firefox, Google Chrome, Opera, UC Browser, etc.) Search Engine (Google, Ask, Etc.); Website: Static & Dynamic; Difference between Website & Portal. • E-mail: Account opening. Sending & Receiving Mails, Managing Contacts & Folders. • E-mail: Internet & Social Networking Ethics. • Types of Viruses & Antivirus. • Computer security issues & its protection through firewall & antivirus Making secured online transactions.	White Board, Group Discussion	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	MS Word Text Editing and formatting using Word 2007 & onwards versions and Formatting documents	Experiments	BL2-Understand	2
2	MS Power point Creating presentation using slide master and template in various themes & variants.	Experiments	BL2-Understand	2
3	MS Excel Working with slides: New slide, move, copy, delete, duplicate, slide layouts, presentation views.	Experiments	BL2-Understand	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	PC Software for Windows by R. K. Taxali Fundamental of Computers by P. K. Sinha
Articles	
References Books	Internet Security by Kenneth EinarHimma, 207 Computer Today by Suresh K. Basandra
MOOC Courses	
Videos	https://www.youtube.com/watch?v=q3rplCwtvU0

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	2	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	3	-	-	-	-	-	-	-
CO4	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-
CO5	5	-	-	-	5	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Calculus and Differential Equations
Course Code	BSMA0101[T]

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Disciplinary Minor							
Pre-Requisite/s	calculus and differential equations include a strong foundation in algebra, trigonometry, pre-calculus, and analytical geometry. Understanding of functions, limits, and basic calculus concepts like derivatives and integrals is essential for success in these subjects.			**Co-Requisite/s**	calculus and differential equations often include concurrent enrollment in courses covering algebra, trigonometry, and pre-calculus. Additionally, a solid understanding of analytical geometry and basic calculus concepts such as limits, derivatives, and integrals is recommended for effective comprehension and application of these subjects.			
Course Outcomes & Bloom's Level	**CO1-** To get insight of fundamental knowledge of Differential, integration and differential equation.**(BL1-Remember)** **CO2-** To understand various techniques to solve real life problems through examples.**(BL2-Understand)** **CO3-** To apply notation of derivative in identifying increasing/ decreasing function, extreme values, concavity, convexity and also higher order derivatives which arise in all applied sciences.**(BL3-Apply)** **CO4-** To analyze behavior of curve through tracing and solution of ordinary differential equation.**(BL4-Analyze)** **CO5-** To evaluate Area, Quadrature, Rectification and Orthogonal trajectories of curves. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Successive differentiation, Leibnitz theorem, Maclaurin's and Taylor's series expansions, asymptotes.	Audio/Video clips, group discussion, lecture with ppt, quiz	8
2	Curvature, tests for concavity and convexity, Points of inflexion, Multiple points, Tracing of curves in Cartesian and polar coordinates.	Audio/Video clips, group discussion, lecture with ppt, Review Analysis	8
3	Integration of transcendental functions, Definite integrals, Reduction formulae, Quadrature, Rectification.	Audio/Video clips, group discussion, lecture with ppt, classroom presentations, Analysis	8
4	Linear differential equations and equations reducible to the linear form, Exact differential equations, First order and higher degree equations solvable for x, y and p, Clairaut's equation and singular solutions, Geometrical meaning of a differential equation, Orthogonal trajectories.	Audio/Video clips, group discussion, lecture with ppt, quiz	8
5	Linear differential equation with constant coefficients, Homogeneous linear ordinary differential equations, Linear differential equations of second order, Transformation of equations by changing the dependent variable independent variable, Method of variation of parameters. **Application of calculus and differential equation in Artificial intelligence and machine learning** • Support vector machines • Decision trees • Neural networks • Flow point: An AI-driven web analytics tool • Math way: An AI math calculator for algebra, graphing, and calculus	Audio/Video clips, group discussion, lecture with ppt, quiz	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
unit 1-5	Application based problem of Calculus and Differential equation in the form of project/case study.	PBL	BL3-Apply	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	G. F. Simmons Differential Equations Tata McGraw Hill, 1972.
Articles	
References Books	H. T. H. Piaggio Elementary Treatise on Differential Equations and their Application C.B.S. Publisher & Distributors, Delhi, 1985
MOOC Courses	https://onlinecourses.nptel.ac.in/noc24_ma12/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview
Videos	https://onlinecourses.nptel.ac.in/noc24_ma12/preview https://onlinecourses.nptel.ac.in/noc24_ma20/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview https://onlinecourses.nptel.ac.in/noc24_ma37/preview

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	1	-	-	-	-	1	-	1
CO2	3	3	1	3	3	2	-	1	-	1	-	-	2	-	2
CO3	3	2	-	1	3	-	-	-	-	-	-	-	1	3	2
CO4	3	2	-	2	-	-	-	-	-	-	-	-	-	3	1
CO5	2	2	-	1	-	-	-	-	-	-	-	-	-	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Mechanics
Course Code	BSPH101

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Disciplinary Minor							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember the basic laws of mechanics and general properties. **(BL1-Remember)** **CO2-** Understand the basic concepts of Newtonian Mechanics**(BL2-Understand)** **CO3-** To enable students to apply the Laws of mechanics to various mechanical systems**(BL3-Apply)** **CO4-** To analyze the applications of Laws of mechanics to various mechanical systems**(BL4-Analyze)** **CO5-** To evaluate the laws of mechanics and its application to various mechanical systems. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT01	**Mathematical Physics** Addition, subtraction and product of two vectors; Polar and axial vectors and their examples from physics; Triple and quadruple product (without geometrical applications); Scalar and vector fields; Differentiation of a vector; Repeated integral of a function of more than one variable; Unit tangent vector and unit normal vector; Gradient, Divergence and Curl; Laplacian operator; Idea of line, surface and volume integrals; Gauss', Stokes' and Green's Theorems	Audio/VideAudio/Video clips, group discussion, lecture with ppt, on white board, Review Analysiso clips, group discussion, lecture with ppt, quiz	
unit 2	**Newton's laws and Conservation principle** Position, Velocity and acceleration Vector Components of velocity and acceleration in different coordinate systems. Newton's Laws of motion and its explanation with problems, and various types of forces in nature (explanation), Conservation of energy and momentum Elastic and inelastic collisions	Audio/VideAudio/Video clips, group discussion, lecture with ppt, on white board, Review Analysiso clips, group discussion, lecture with ppt, quiz	
unit 3	**Rigid Body Dynamics** Concept of rigid body System of particles, Translational and Rotational motion, Moment of Inertia and their Product, Principal moments and axes, Calculation of moment of inertia lamina, disc, solid cylinder and sphere, Motion of Rigid Body, Euler's equation, Centre of mass and reduced Mass. Pseudo Forces (e.g. Centrifugal Force), Coriolis force and its applications	Audio/VideAudio/Video clips, group discussion, lecture with ppt, on white board, Review Analysiso clips, group discussion, lecture with ppt, quiz	
UNIT04	**Central forces and Oscillations** Motion under a central force, Derivation of Kepler's laws. Gravitational law and field, Potential due to a spherical body. Gauss & Poisson's equation of Gravitational self-energy. Concept of Simple, Periodic & Harmonic Oscillation with illustrations; Differential equation of harmonic oscillator; Kinetic and potential energy of Harmonic Oscillator; Oscillations of two masses connected by a spring	Audio/VideAudio/Video clips, group discussion, lecture with ppt, on white board, Review Analysiso clips, group discussion, lecture with ppt, quiz	
UNIT05	**Relativistic Mechanics** Michelson-Morley experiment and its outcome; Postulates of Special Theory of	Audio/VideAudio/Video clips, group discussion, lecture with ppt, on white board, Review Analysiso clips, group discussion, lecture with ppt, quiz	

	Relativity; Lorentz Transformations.Simultaneity and order of events; Lorentz contraction; Time dilation; Relativistic transformation of velocity ,frequency and wave number; Relativistic addition of velocities; Variation of mass with velocity		

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Unit1	Triangle law using Gravesend apparatus	PBL	BL2-Understand	3
unit -03	Parallel and perpendicular Axis theorem	PBL	BL3-Apply	3
Unit-3	Moment of inertia by Flywheel.	PBL	BL2-Understand	3

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	

Part E

Books	D.S. Mathur Mechanics: 1Edition
Articles	
References Books	Sears and Zeemansky University Physics XI edition R P Goyal Unified Physics Shivlal Agrawal
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Chemistry in daily life
Course Code	GEC0101

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Generic Elective							
Pre-Requisite/s	Student should have basic knowledge of chemistry			**Co-Requisite/s**	Student will emphasize on the application of chemistry principles and the scientific method in contexts such as medicine, health, and the environment			
Course Outcomes & Bloom's Level	**CO1-** Learn about the chemistry of ancient India. ancient construction materials and discoveries.**(BL1-Remember)** **CO2-** Gain information about acids. bases and salt: involved in our day to day life**(BL2-Understand)** **CO3-** Have an idea of food adulteration, its harmful effects. and methods to detect adulteration and the important constituents of our food**(BL3-Apply)** **CO4-** Student will be familiar with the chemical nomenclature of the commonly used materials in daily life including toiletries, kitchen and beverages.**(BL4-Analyze)** **CO5-** Have an Elementary idea of disinfectants. pesticides and cleaners**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✓ Gender ✕ Human Values ✓ Environment ✓		**SDG (Goals)**	SDG2(Zero hunger) SDG3(Good health and well-being) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG9(Industry Innovation and Infrastructure) SDG12(Responsible consuption and production) SDG13(Climate action) SDG14(Life below water) SDG15(Life on land)				

Part B

Modules	Contents	Pedagogy	Hours
Module 1	Ancient Chemistry- • Chemistry in Ancient India Alchemy • Construction material in ancient times like Pottery, Bricks. Cement. Minerals. • Discovery and Uses of Glass, cosmetics & perfumes, paper & ink. • Metal extraction in ancient time. fibre cloth and dying chemistry in ancient times. • Basic introduction of chemistry: Elements (upto atomic number 36), atoms. molecules and compounds.	Interdisciplinary Integration, Hands-On Experiments, Project-Based Learning	8hrs
Module 2	Acids, Bases and Salts in Daily Life - Definition of acids, bases and neutral 12 substances, pH scale.. Sources and uses of • Acids- hydrochloric acid, acetic acid(vinegar), ascorbic acid, carbonic acid, sulfuric acid, tartaric acid, citric acid. • Bases- sodium hydroxide, magnesium hydroxide. calcium hydroxide ammonia. • Salts- sodium fluoride, sodium chloride, sodium carbonate. sodium bicarbonate. copper sulphate. alums, calcium carbonate, ammonium chloride	Interactive Experiments, Real-Life Applications,Group Activities	8 hrs
Module 3	Major Components of our Food- Basic idea of vitamins. minerals. fats. carbohydrates. proteins and fibers, their function and sources. Functions and importance: Vitamin B complex. antioxidants, micronutrients like iron., zinc, calcium Food Adulteration- definition, types, harmful effects • Common adulterants and their detection in- milk. ghee. mustard oil. sugar. salt, tea, chilli powder. black pepper. turmeric powder, honey. • Harmful effects of food additives- saccharin. monosodium of glutamate(Ajinomoto). Sulphur dioxide. preservatives	Interactive Learning, Project-Based Learning, Field Visits and Guest Lectures	10 hrs
Module 4	Basic Knowledge of important Chemical constituent of materials used in everyday life- • Toothpaste. different types of' soaps, detergents and cosmetics, nail polish remover. • Table salt. rock salt, sugar. • Baking soda, caustic soda, baking powder • Coffee and tea, chemicals involved in processing of bakery products. • Onion, garlic. spices like turmeric. chilly • Oil and fats.. • Soda drinks. alcohol and tobacco	Observation and Analysis, Interdisciplinary Integration, Visual and Multimedia Tools	8 hrs
Module 5	**Elementary idea of disinfectants, pesticides and cleaners** • Alcohol based hand sanitizers. sodium hypo chlorite. naphthalenc. Antiseptic solutions.	Simple Experiments, Awareness Campaigns:	8 hrs

	• Pesticides and insecticides like DDT. mosquito repellent. boric acid. Toilet cleaners. Domestic phenyls. Floor cleaner		

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	To prepare Calcium carbonate in laboratory	Experiments	BL6-Create	1hrs
Module 2	To Magnesium carbonate in laboratory	Experiments	BL6-Create	1hr
Module 3	To prepare Tincture iodine in laboratory	Experiments	BL6-Create	1 hr
Module 4	To prepare potash alum	Experiments	BL6-Create	1 hr
Module 5	• To prepare acetanilide.	Experiments	BL6-Create	1hr
Module 6	• To prepare Chloroform water	Experiments	BL6-Create	1 hr
Module 7	• To prepare Camphor water.	Experiments	BL6-Create	1 Hr
Module 8	• To prepare Rose water from rose oil.	Experiments	BL6-Create	1 hr
Module 9	To prepare simple syrup	Experiments	BL6-Create	1 hr

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	18
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	60	40	

Part E

Books	Cox H,E.: ANALYSIS OF Foods 13. Cox H.E. AND PEARSON CHEMICAL ANALYSIS OF Foods SHAKUNTALA MANY N, AND SWAMY S. FoODS: FACTS AND PRINCIPLES. 4TH ED, NEW AGE INTERNATIONAL (1998) JAIN AND JAIN, ENGINEERING CHEMISTRY. DHANPATRAL PUBLLISUING COMPANY Garforth, F. (1986). Chemistry through the looking glass. In P. E. Childs (ed.) Limerick, Everyday Chemistry (pp 4-45) Thomond College
Articles	https:/ncert.nic.in/textbook/pdt/gesc105.pdf
References Books	Bailin, S. (2002). Critical thinkine and science education, Science & Educatior.. 1, 361-75 S. Childs. P. E. (1986). What is evervday chemistry? In P. E Childs (ed.), Everyday chemistry. Limerick: Thomond College. Hatfield: ASE (1985). Education through science Ray Prafulla Chandra History of Chcmistry in ancient and Medieval India: Incorporatiny thc History of Hindu Chemistry 1 January 2004 Chowkhambha Sanskrit serires office
MOOC Courses	https://nptel.ac.in/courses/104/103/104103071/
Videos	MOOCs. NPTEL, SWAYAM. HE E-Contents https://tamilandvedas.com/2019/11/04/rare-chemistry-alchemy-medicine-books-of-ancient-india post-no-7178/ https://nptel.ac.in/content/storage2/courses/ 103107082/module l/lecture l/lecture l.pdf https://nptel.ac.in/courses/104/103/104103071/ https://onlinecourses.swayam2.ac.in/ugc19 bt16/preview

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	-	-	1	1	-	-	-	-	-	1	-	-
CO2	1	-	1	-	-	-	-	-	-	-	-	-	-	1	1
CO3	-	1	1	2	-	-	-	-	-	-	-	-	2	2	3
CO4	-	1	-	1	-	1	2	-	-	-	-	-	1	1	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Bioinstrumention
Course Code	SEC0101

Part A

Year	1st	**Semester**	1st	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s	Should be acquainted with the basics knowledge of instruments and their uses.			**Co-Requisite/s**	Knowledge of food analysis and food adulteration			
Course Outcomes & Bloom's Level	**CO1-** Demonstrate an understanding of physics and engineering in biosensor, electrodes**(BL1-Remember)** **CO2-** Demonstrate an understanding of the biomedical instrumentation principles in aspects of device design and applications**(BL2-Understand)** **CO3-** Apply these principles in the context of bioinstrumentation interactions with tissues, organs and human body to explain the measurement results and to develop the instrumentation**(BL3-Apply)** **CO4-** Students will demonstrate these abilities and hone the appropriate information gathering, computational and data-handling skills in homework and lab exercises.**(BL4-Analyze)** **CO5-** They will demonstrate their proficiency formally in examinations**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
1	Microscopy: History, principle, types and applications (Bright field, dark field and fluorescent microscopy). Electron microscope: principle and applications of scanning electron , transmission electron microscope.	Audio/Video clips, group discussion, lecture with ppt, quiz	8
2	Centrifugation: Basic principle, types (analytical and ultracentrifugation) and applications.	Audio/Video clips, group discussion, lecture with ppt, Review Analysis	8
3	Chromatography: Principle, working and applications of Paper chromatography, thin layer chromatography, gel filtration chromatography, ion exchange chromatography and affinity chromatography,.	Audio/Video clips, group discussion, lecture with ppt, classroom presentation	8
4	Electrophoresis: principles, types and applications of paper, agarose gel & PAGE electrophoresis. Radioactivity: principle of radioactive decay, half life. Radioisotopes: applications in biological sciences, Scintillation counters: basic principle and application.	Audio/Video clips, group discussion, lecture with ppt, quiz	8
5	Spectrum and their Types, wave length range of electromagnetic radiation. Spectroscopy: basic principle and applications of colorimetry and U.V, Visible and Infrared spectroscopy. Microtomy: Basic principle and applications	Audio/Video clips, group discussion, lecture with ppt, quiz	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	0
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
	0				

Part E

Books	Nelson, D. L., Lehninger, A. L., & Cox, M. M. (2008, February 1). Lehninger Principles of Biochemistry. Macmillan.
Articles	
References Books	Work, T. S., & Work, E. (1983, January 1). Laboratory Techniques in Biochemistry and Molecular Biology Williams, B. L., & Wilson, K. (1975, January 1). A Biologist's Guide to Principles and Techniques of Practical Biochemistry.
MOOC Courses	https://nptel.ac.in/courses/126105020
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	-	1	-	1	-	1	-	-	1	1	1
CO2	2	1	1	1	1	-	-	1	-	1	-	-	1	1	1
CO3	2	2	2	2	1	1	1	1	1	1	-	-	2	1	1
CO4	3	2	2	1	1	-	1	-	1	-	1	-	2	1	1
CO5	3	2	2	1	1	1	1	1	1	-	1	-	2	1	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	English-I
Course Code	AEC0201[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Ability Enhancement Courses							
Pre-Requisite/s	The students have a basic knowledge and understanding of the English language and communication.			**Co-Requisite/s**	Communication skills, Leadership development etc.			
Course Outcomes & Bloom's Level	**CO1-** Determine interpersonal skills and be an effective goal-oriented team player**(BL1-Remember)** **CO2-** Elaborate creativity and lateral thinking**(BL2-Understand)** **CO3-** Examine attitudes, emotional intelligence and understand its influence on behavior**(BL3-Apply)** **CO4-** Justify approaches to conflict resolution.**(BL4-Analyze)** **CO5-** Evaluate goal setting, management, decision-making skills.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Module 1	Where the Mind is Without Fear, The Tryst with Destiny The Hero, Indian Weavers The Portrait of a Lady The Solitary Reaper	Classroom Lecture, PPts, Videoes	10
Module 2	Basic Language Skills Synonyms, Antonyms,Homonyms, Word Formation,Prefix, Suffix	Classroom Lecture, PPts,	6
Module 3	Uncountable Noun, Verb, Tense, Adverb	Classroom Lecture, PPts,	6
Module 4	Trading Comprehension, Unseen Passage	Classroom Lecture, PPts, Videos	4
Module 5	Introduction to Report Writing, Major Objectives of Writing Reports, Significance of Business/Technical, Types and Forms of Reports, Styles of Writing Reports – Printed format, Memo Format, Letter Format, Book/Letter Text Format, Layout and Structure of Reports, Components of Report Writing.	Classroom Lecture, PPts, Videos	5

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	C. Muralikrishna and S. Mishra (2011) Communication Skills for Engineers, Pearson education. ISBN: 9788131733844
Articles	Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998.
References Books	Technical Communication – Principles and Practices by Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2007, New Delhi.
MOOC Courses	https://nptel.ac.in/courses/109103020
Videos	https://nptel.ac.in/courses/109103020

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	-	-	2	-	-	1	-	1
CO2	2	2	1	2	2	2	-	-	-	2	-	-	1	-	3
CO3	2	1	1	-	1	-	-	-	-	2	-	-	3	2	3
CO4	3	2	-	2	1	-	-	-	-	2	-	-	2	3	3
CO5	3	2	-	2	1	-	-	-	-	2	-	-	2	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Operating System
Course Code	BSCS0201[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	0	0	3
Course Type	Theory only							
Course Category	Disciplinary Major							
Pre-Requisite/s	Must have knowledge the computer architecture.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To Remember the basics of Computer Knowledge.**(BL1-Remember)** **CO2-** To Understand the concept of System Programmer's view**(BL2-Understand)** **CO3-** To apply the various techniques of Operating system in the field of Computer Science**(BL3-Apply)** **CO4-** To analysis of Inter-process Communication and Synchronization of Operating system.**(BL4-Analyze)** **CO5-** To evaluate the study problem from application point of view by using the results of the different algorithms and solve real life base problems which arise in all applied sciences**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction: Evolution of operating system, Types of operating systems, Multitasking, Timesharing, Multithreading, Multiprogramming and, Real time operating systems, Different views of the operating system, System Programmer's view, User's view, Operating system concepts and structure, Layered operating system, Monolithic systems.	White Board, Group Discussion	8
2	Processes: The Process concept, The process control block, System programmer's views of processes, Operating system services for process management, Scheduling algorithms, FCFS, Round robin, Shortest run time next, Highest response ratio next, Multilevel Feedback Queues, Performance evaluation of scheduling algorithms.	White Board, Group Discussion	8
3	Memory Management : Memory management without swapping or paging, Concepts of swapping and paging, page replacement algorithms namely, Least recently used, Optimal page replacement, Most recently used, Clock page replacement, FIFO, Modeling paging algorithms, Design issues for paging system, Segmentation, Segmented paging, Paged Segmentation.	White Board, Group Discussion	8
4	Inter-process Communication and Synchronization: The need for Inter-process Synchronization, Concept of Mutual exclusion, binary and counting semaphores, Classical problems in concurrent programming, Dining Philospher's problem, Bounded Buffer Problem, Readers and Writers problem, Critical section, Critical region and conditional Critical region, Monitors and Messages.	White Board, Group Discussion	8
5	Deadlocks: Concepts of deadlock detection, deadlock prevention, deadlock avoidance, Banker's Algorithm, Disk: Disk hardware, Disk scheduling algorithms, Error handling, Track at a time caching, RAM Disks.	White Board, Group Discussion	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Operating System Concepts An Introduction to Operating System
Articles	
References Books	Gavlin P, .L. Abraham Silberschatz. Deitel, H.M.
MOOC Courses	
Videos	https://www.youtube.com/watch?v=vBURTt97EkA

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	3	-	-	-	-	-	-
CO4	-	4	-	-	-	-	-	-	-	4	-	-	-	-	-
CO5	-	-	-	5	-	5	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	DBMS
Course Code	BSCS0202[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Basic understanding of software and programming language. Basic data manipulation operations, file handling, file organization. Set Theory (Mathematics) Cartesian, cross product and discrete mathematics.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To Remember the basics of Computer Knowledge. **(BL1-Remember)** **CO2-** To Understand the basic theory of the relational model and both its strengths and weaknesses**(BL2-Understand)** **CO3-** To apply the various techniques of SQL programs in the field of Computer Science**(BL3-Apply)** **CO4-** To analysis of design entity-relationship diagrams to represent simple database application scenarios**(BL4-Analyze)** **CO5-** To evaluate the study problem from User point of view by using the results of the different SQL Programs and Familiar with various recent trends in the database area.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕			**SDG (Goals)**	SDG4(Quality education)			

Part B

Modules	Contents	Pedagogy	Hours
1	Purpose of date base system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages:- DDL, DML, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal:- external, conceptual & internal levels	White Board, Group Discussion	8
2	Entity relationship model as a tool of conceptual design: entities & entities set, relationship and relationship set, attributes and mapping constraints, keys, ER diagram:- strong and weak entities, generalization specialization & aggregation, reducing ER diagram to tables.	White Board, Group Discussion	8
3	Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity, extension and intention, relational algebra: select, project, Cartesian product, different types of joints: theta, equi, natural, outer joins, set operations.	White Board, Group Discussion	8
4	Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF, & BCNF normal forms, multi valued dependency, join dependency, 4NF, 5NF.	White Board, Group Discussion	8
5	Basic concepts:- Indexing and Hashing, B-tree Index files, Hashing: Static & Dynamic hash function, Index definition in SQL: Multiple key accesses.	White Board, Group Discussion	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	WAQ to insert some new records in emp table.	Experiments	BL2-Understand	2
2	WAQ to list the number of employees whose name is not „ford", „jams" or „jones"	Experiments	BL2-Understand	2
3	WAQ to list the name and salary and sort them in descending order of their salary	Experiments	BL2-Understand	2
4	WAQ to list the details of employees whose name is starts from „a"	Experiments	BL2-Understand	2
5	WAQ to delete all records form emp table	Experiments	BL2-Understand	2
6	WAQ to list the student name having „d" as second character.	Experiments	BL2-Understand	2
7	WAQ to list the name and salary and sort them Id descending order of their salary	Experiments	BL2-Understand	2
8	WAQ in employee table find all the manager who earns between 1000 and 2000	Experiments	BL2-Understand	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	40	20	60	30

Part E

Books	Database System Concepts by Henry Korth and A. Silberschatz Simplification approach to DBMS, Prateek Bhatia, Gurvinder Singh Kalyani Publication
Articles	
References Books	An Introduction to Database System by Bipin Desai An Introduction to Database System by C.J. Date.
MOOC Courses	
Videos	https://www.youtube.com/playlist?list=PLxCzCOWd7aiFAN6I8CuViBuCdJgiOkT2Y

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
CO3	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	4	-	-	-	-	-	-	-	-	-	4	-	-	-
CO5	-	-	5	-	5	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Abstract Algebra
Course Code	BSMA0201[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Disciplinary Minor							
Pre-Requisite/s	Basic Knowledge of Set theory and Basic understanding of elementary mathematics.			**Co-Requisite/s**	Understanding of sets, subsets, operations on sets, and basic set operations such as union, intersection, and complement. Familiarity with fundamental algebraic structures such as groups, rings, and fields, including their definitions, properties, and basic examples.			
Course Outcomes & Bloom's Level	**CO1-** CO1: To remember the basic knowledge of the Groups, Subgroups, Normal Subgroups, Cyclic Groups, Homomorphism and Isomorphism of groups, Automorphisms, Ring and Field.**(BL1-Remember)** **CO2-** CO2: To understand the fundamental concept and properties of Groups, Rings, Fields and integral domains. **(BL2-Understand)** **CO3-** CO3: To apply the knowledge of groups, rings, fields and integral domains in all the fields of learning including higher research and extensions.**(BL3-Apply)** **CO4-** CO4: To analyze and solve the well-defined problems in mathematics related to the different groups, rings, and fields.**(BL4-Analyze)** **CO5-** CO5: To evaluate the studied problems from application point of view by using the results of the different theorems.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Definition and basic properties of groups, subgroups, Subgroups generated by a subset, Cyclic groups and simple properties.	Audio/Video clips, group discussion, lecture with ppt, quiz	8
2	Coset decomposition, Lagrange's theorem and its corollaries including Fermat's theorem, Normal subgroups and Quotient groups.	Audio/Video clips, group discussion, lecture with ppt, Review Analysis	9
3	Homomorphism and Isomorphism of groups, Fundamental theorem of homomorphism, Transformation and Permutation group, sn (Various subgroups of Sn n< 5 to be studied),Cayley's theorem.	Audio/Video clips, group discussion, lecture with ppt, classroom presentations, Analysis	10
4	Group Automorphisms, Inner Automorphism, Group of Automorphisms,Conjugacy relation and Centralizer,Normaliser, Counting principle and class equation of a finite group, Cauchy's theorem for finite abelian groups and non- abelian groups.	Audio/Video clips, group discussion, lecture with ppt, quiz	9
5	Definition and basic properties of rings, Ring homomorphism subrings, Ideals and Quotient rings, Polynomial rings & its properties, Integral domain and Field. **Application of AI in abstract algebra** • Automated Problem Solving • Automated Theorem Proving • **Applications in Cryptography** • Classification and Optimization • Education and Visualization Tools: • **Geogebra**: For visualizing algebraic structures. • **Python Libraries**: NetworkX for Cayley graphs.	Audio/Video clips, group discussion, lecture with ppt, quiz	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
unit 1-5	Application based problem of Abstract Algebra in the form of project/case study.	PBL	BL3-Apply	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	I. N. Herstein, Topics in Algebra Wiley Eastern Ltd. New Delhi,
Articles	
References Books	Shantinarayan A Text Book of Modern Abstract Algebra S. Chand and Company, New Delhi
MOOC Courses	https://onlinecourses.nptel.ac.in/noc24_ma06/preview
Videos	https://onlinecourses.nptel.ac.in/noc24_ma06/preview

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	3	-	-	-	-	1	-	-	-	-	-	-
CO2	1	-	-	2	-	-	-	-	1	-	-	-	-	-	-
CO3	-	2	-	-	1	-	-	-	-	2	-	-	-	-	-
CO4	2	-	1	-	-	-	-	2	-	-	-	-	-	-	-
CO5	1	-	-	2	-	-	-	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Thermodynamics and Kinetic Theory of Gases
Course Code	BSPH0201[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Knowledge of Physics upto Class 12			**Co-Requisite/s**	Knowledge of Mathematics upto Class 12			
Course Outcomes & Bloom's Level	**CO1-** To remember the basic laws of Thermodynamics and Kinetic theory of Gases**(BL1-Remember)** **CO2-** Understand the basic concepts of Thermodynamics and Kinetic theory of Gases**(BL2-Understand)** **CO3-** To apply the concepts of Thermodynamics and Kinetic theory of Gases to different system**(BL3-Apply)** **CO4-** To Analyze the laws of Thermodynamics and Kinetic theory of Gases **(BL4-Analyze)** **CO5-** To evaluate the laws of thermodynamics and Kinetic theory of Gases**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✓ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	First Law of Thermodynamics and Heat engines Basic Concepts of Thermodynamics Reversible and irreversible process, First Law of Thermodynamics Heat engines, Definition of efficiency, Steam engine, Otto engine, Petrol engine, Diesel engine, Effective way to increase efficiency Carnot's ideal heat engine, Carnot's cycle, Second law of thermodynamics, Various statements of Second law of thermodynamics, Carnot's theorem Refrigerator, Coefficient of performance.	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
2	Entropy & II law of thermodynamics Concept of entropy, Change in entropy in adiabatic process, Change in entropy in reversible Cycle Principle of increase of entropy, Change in entropy in irreversible process .T-S diagram, Physical significance of Entropy, Entropy of a perfect gas	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
3	Thermodynamic Potentials and Maxwell Relations Thermodynamic Potentials and Maxwell Relations and its applications like Clausius-Clapeyron equation, CP – CV , CP / CV Change in temperature in adiabatic change, TdS equations	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
4	Production of Low Temperatures Introduction, Traditional methods of cooling, Adiabatic cooling, Joule□Thomson effect, Adiabatic demagnetization, Practical uses and applications of low temperatures.	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
5	Kinetic Theory of Gases Behavior of real gas and its deviation from an ideal gas, viral equation, Andrew's experiment on CO2 gas. Critical constants, continuity of the liquid and gaseous states. Vapour and gas state Boyal Temperature, Van der Waals equation for real gas, Values of critical constant, Law of corresponding state.	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To determine the Specific heat capacity of a given substance with help of electric kettle.	Experiments	BL2-Understand	3
2	To study of different thermocouples and Plot a graph between thermo EMF and temperature of hot junction.	Experiments	BL4-Analyze	3
3	To determine the mechanical equivalent of (J) with the help of Joule's calorimeter	Experiments	BL2-Understand	3
4	To verify Newton's law of cooling	Experiments	BL2-Understand	3
5	To Find the Melting Point of a given substance (Wax), Using Platinum Resistance Thermometer.	Experiments	BL2-Understand	3
6	Determine the Melting Point of Paraffin wax using thermocouples.	Experiments	BL2-Understand	3
7	To determine the Brake power of a Disel Engine	Experiments	BL2-Understand	3
8	To determine the specific fuel consumption. of a Disel Engine	Experiments	BL2-Understand	3

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	

Part E

Books	Thermal Physics by Garg, Bansal and Ghosh
Articles	
References Books	Thermodynamics, Kinetic theory of gases and statistical thermodynamic by Sears and Salinger
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	2	2	1	-	-	-	-	-	-	-	-
CO2	1	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	3	-	2	2	-	-	-	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	1	-	-	3	-	2	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Disinfection and Sterilization
Course Code	GEC201

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s	Basic knowledge of microbiology is essential to understand the principles' of microbial control			**Co-Requisite/s**	Concurrent study of infection control and pharmacology enhances understanding of disinfections and sterilization practices in clinical settings.			
Course Outcomes & Bloom's Level	**CO1-** To describe the difference between disinfection and sterilization**(BL1-Remember)** **CO2-** To understand the physical methods of disinfection and sterilization.**(BL2-Understand)** **CO3-** To identify different quality control monitors available for high-level disinfection and sterilization.**(BL3-Apply)** **CO4-** To understand and apply artificial intelligence in waste handling and management**(BL3-Apply)** **CO5-** To apply the subject knowledge in future perspectives i.e. such as in research and development in food products**(BL4-Analyze)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG9(Industry Innovation and Infrastructure) SDG12(Responsible consuption and production)				

Part B

Modules	Contents	Pedagogy	Hours
I	Introduction of Disinfection and sterilization: Basics of disinfection, sterilization, sanitization, determination, asepsis, antisepsis, bacteriostatic, bactericidal. Factors influencing the effectiveness of antimicrobial treatments. Mode of action of sterilization.	Lecture, PPT,PBL	7
II	Physical methods of sterilization: Temperature, Filtration, desiccation, osmotic pressure, Radiation Applications of sterilization	Quiz, Illustrate with analogies, Interactive	7
III	Control of microorganism by chemical Sterilization methods. Characteristics of an ideal antimicrobial chemical agents Chemical methods of disinfection: Phenolic compounds, Halogens, Alcohols and heavymetals	Quiz, Tutorials sessions, Expert Lecture	7
IV	Other chemical compounds as sterilizers i.e. detergents, quaternary ammonium compound, aldehydes, and gaseous sterilizer	Lecture with ppt, quiz	6
V	Chemotherapeutic agents: antibiotics and synthetic drugs. Applications of Disinfection Application of artificial intelligence in (waste) water disinfection	Audio/Video clips, group discussion, lecture with ppt, quiz	6

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
I	Application of Steam autoclaving to destroy microorganisms and decontaminate infectious waste	Experiments	BL3-Apply	3
II	To conduct filtration and centrifugation of waste water	Experiments	BL4-Analyze	2
III	Exhibition of normal Air Flora from various regions of the university campus	PBL	BL5-Evaluate	72
IV	Exhibition, demonstration and comparison of hand washing using various disinfecting agents	PBL	BL4-Analyze	72
V	To check the efficiency of chemical compounds as disinfectants	Experiments	BL4-Analyze	24
VI	To visit the VRS foods private ltd to know the basic sterilization process of food products	Industrial Visit	BL2-Understand	6

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	35	60	18	40	20
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Pelczar Jr M. J et al., Microbiology, 5th edition
Articles	
References Books	J. M. Willey, L. M. Sherwood, C. J. Woolverton, Prescott, Harley, and Klein's Microbiology 7th edition
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	India in 21st centuary
Course Code	IKS

Part A

<table>
<tr><td rowspan="2">Year</td><td rowspan="2">1st</td><td rowspan="2">Semester</td><td rowspan="2">2nd</td><td rowspan="2">Credits</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>2</td><td>0</td><td>0</td><td>2</td></tr>
<tr><td>Course Type</td><td colspan="8">Theory only</td></tr>
<tr><td>Course Category</td><td colspan="8">Indian Knowledge System (IKC)</td></tr>
<tr><td>Pre-Requisite/s</td><td colspan="3">1. *Understanding of Sociological Concepts*: A foundational knowledge of sociological concepts is essential to grasp the composition of Indian society discussed in Unit I. This includes understanding social institutions, cultural environments, and threats to national integration. 2. *Historical Background*: Familiarity with the history of India, particularly the Indian Freedom Movement, is crucial for comprehending Unit II. Knowledge of events such as the Revolt of 1857, the emergence of nationalism, and the various phases of the freedom struggle provides context for understanding the birth of the Indian nation-state. 3. *Awareness of Political Movements*: A basic understanding of political movements in India, particularly those led by figures like Gandhi, is necessary for Unit III. Familiarity with concepts like non-cooperation, civil disobedience, and the Quit India movement aids in analyzing the dynamics of Indian freedom and partition. 4. *Knowledge of Post-Independence Era*: Understanding the phases of nation-building since independence is vital for Unit IV. This includes awareness of the planned progress era, populist policies, and the paradigm shift towards liberalization and globalization. Knowledge of responses from different societal groups and regions enriches the understanding of India's post-independence journey. 5. *Global Awareness*: Unit V delves into global concerns such as environmental issues, globalization, and movements for democracy and sustainability. A broad understanding of global trends and their impact on nations is necessary to engage with this content effectively.</td><td>Co-Requisite/s</td><td colspan="4">1. *Foundational Understanding of Sociological Concepts*: - Understanding social institutions, cultural environments, and threats to national integration is fundamental. - Familiarity with sociological theories such as functionalism, conflict theory, and symbolic interactionism can provide a deeper comprehension of societal dynamics. 2. *Historical Context of India*: - Knowledge of Indian history, including the colonial period, the struggle for independence, and post-independence developments, offers context for understanding the evolution of Indian society. - Understanding the socio-economic impacts of colonial rule and the transition to independence enhances insight into contemporary social issues. 3. *Understanding of Political Movements in India*: - Knowledge of key figures, ideologies, and strategies of political movements in India, including those led by Gandhi, Nehru, and other prominent leaders, is essential. - Awareness of the socio-political context of colonial India and the role of various stakeholders in the struggle for independence enriches understanding. 4. *Familiarity with Post-Independence Developments*: - Understanding the socio-economic and political changes in post-independence India, including the Nehruvian era, economic reforms, and social movements, is crucial. - Awareness of key policies, such as the Green Revolution, reservation system, and economic liberalization, provides insights into contemporary Indian society. 5. *Global Perspective and Awareness*: - Knowledge of global trends in areas such as technology, economics, environment, and geopolitics enhances understanding of India's position in the global context. - Understanding global issues like climate change, international trade, and human rights movements enables students to analyze their impact on India and vice versa.</td></tr>
<tr><td>Course Outcomes & Bloom's Level</td><td colspan="8">CO1- It will help students to remember their personality and thinking horizon for being a good and concerned Indian citizen(BL1-Remember)
CO2- The students will have an understanding of making of India as a nation .(BL2-Understand)
CO3- The students will have an analyse salient features of modern India .(BL3-Apply)
CO4- At the end of this course, students would analyze intellectually well equipped to have a sense of modern Indian history and culture .(BL4-Analyze)</td></tr>
<tr><td>Coures Elements</td><td colspan="2">Skill Development ✓
Entrepreneurship ✕
Employability ✓
Professional Ethics ✕
Gender ✕
Human Values ✓
Environment ✕</td><td>SDG (Goals)</td><td colspan="5">SDG1(No poverty)
SDG3(Good health and well-being)
SDG4(Quality education)
SDG5(Gender equality)
SDG10(Reduced inequalities)
SDG12(Responsible consuption and production)
SDG13(Climate action)</td></tr>
</table>

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Idea of India in historical perspective a) Indian culture, b) cultural commonness, c)cultural diversities, d)unity in diversity, e) culturall accomodations ,f) cultural conflicts, g)Idea of India and British Rule , h) Role of Indian Intelligentsia	lecture method and video clips/films on specific themes/topics, illustrations, classroom discussions, role play	8 hrs
Unit 2	. Emergence and growth of Indian Nationalism a) Anti-colonial basis ,b) Economic Nationalism ,c) communalism and nationalism ,d) revivalism and Indian nationalism ,e)Enlightenment values ,f)European Nationalism and Indian Nationalism	lecture method and video clips/films on specific themes/topics, illustrations, classroom discussions, role play	8 hrs
Unit 3	Social Reform Movements a) British Rule and Indian introspection ,b)Raja Rammohan Roy, c) social reform movements in 19th century , d)Swami Vivekanand ,e)The women issue ,f)Caste system	lecture method and video clips/films on specific themes/topics, illustrations, classroom discussions, role play	8 hrs
Unit 4	Indian National Movement a)Early Revolts and 1857 Revolt, b)Early Nationalists ,c) Bang Bhang Movement , d) Gandhi led Mass Movements, e) Socialist and Left trends , f) Princely States and their integration into nation, h)Partition and Independence .	lecture method and video clips/films on specific themes/topics, illustrations, classroom discussions, role play, debates	8 hrs
Unit 5	India after independence a)Making of Indian Constitution ,b) Post Independent Nehru Era , c) India facing Wars , d) Indian econmy- From Planning to LPG ,e) Achievements, f) Challenges in 21st century India.	lecture method and video clips/films on specific themes/topics, illustrations, classroom discussions, role play	8 hrs

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
0	0	Experiments		00

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Bipan Chandra and others: India's Struggle For Independence , Penguine Publishers. Bipan Chandra: History Of Modern India, Orient Blackswan publishers. Sunil Khilnani: The Idea of India, Penguine publishers.
Articles	.https://www.youtube.com/watch?v=i8N6YRTJsDk
References Books	Shekhar Bandopadhyay: From Plastic to Partition and After, A History of Modern India, Orient Blackswan publishers. Shekhar Bandopadhyay: From Plastic to Partition and After, A History of Modern India, Orient Blackswan publishers. A R Desai:Social Background of Indian Nationalism, Popular Prakashan . B R Nanda: Mahatma Gandhi ,A Biography,London
MOOC Courses	1.https://www.youtube.com/watch?v=i8N6YRTJsDk
Videos	1.https://www.youtube.com/watch?v=i8N6YRTJsDk 2. https://youtu.be/MWsT7x3qd3E 3.https://www.youtube.com/watch?v=pQghqJSUAK4&list= 4.https://youtu.be/9BEU8A_JZPU 5.https://youtu.be/pPsKQwaZ4dg

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	2	1	-	-	1	-	-	-	-	1
CO2	-	-	-	-	-	1	1	-	1	-	-	1	-	-	1
CO3	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	2	-	-	-	1	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Environmental Studies
Course Code	SEC0201[T]

Part A

Year	1st	**Semester**	2nd	**Credits**	L	T	P	C
					2	00	1	3
Course Type	Embedded theory and lab							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s	To pursue environmental science, a strong foundation in science and math is generally required. This typically involves completing high school courses in biology, chemistry, physics, and mathematics, including algebra and often pre-calculus or calculus.			**Co-Requisite/s**	Environmental science is inherently multidisciplinary, so co-requisites reflect the need for students to have a foundational understanding of various scientific disciplines. Physics, maths, chemistry are co-requisites of environmental studies.			
Course Outcomes & Bloom's Level	**CO1-** CO1. Understanding: To understand the various concepts of environmental sciences, ecosystem, ecological succession and also about its functions and knowledge about the conservation of biodiversity and its importance and environmental impacts of human activities on natural resource.**(BL2-Understand)** **CO2-** CO2. Applying: To acquire analytical skills in assessing environmental impacts through a multidisciplinary approach**(BL3-Apply)** **CO3-** CO3. Analyzing: Ability to distinguish between various methods of various pollution analysis**(BL4-Analyze)** **CO4-** CO4. Evaluating: Acquire expertise and skills needed for the Environmental Management Systems and techniques of monitoring, Environment audit, Environmental Impact Analysis, environment instrumentation and control systems and maintenance. **(BL5-Evaluate)** **CO5-** CO5. Creating: Students acquire skills for to communicate, prepare, plan and implement the environmental management project**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✓		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG6(Clean water and sanitation) SDG7(Affordable and clean energy) SDG8(Decent work and economic growth) SDG10(Reduced inequalities) SDG11(Sustainable cities and economies) SDG13(Climate action) SDG14(Life below water) SDG15(Life on land) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
Unit – 1 (Environment, Ecosystem and Environmental Education)	Environment – Definition and its segments, (Lithosphere, Hydrosphere, Atmosphere and Biosphere) multidisciplinary nature of Environmental Science, Ecology and Ecosystem: Basic concepts, functions of ecosystem, Energy Flow, Food chain, food web, Ecological Pyramids, Ecological Successions. Environmental Education- Definition, scope, importance, Need for Public Awareness, Environmental Ethics.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, discussion (questions & answers section)	8
2 (Natural Resources Management)	Natural Resources – Classification, Water Resources and Forest Resources. Energy Resources- Classification-Conventional resources (Mineral, Oil, Coal, Gas, Nuclear Energy and Thermal Power)-Non-conventional resources (Solar, Geothermal, Wind energy, Biomass and Bio-gas).	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
3 (Water, Soil & Noise Pollution)	Water pollution – sources & effects. Characteristics and treatment of waste water (STP & ETP). Soil - formation of soil, elementary and mineral composition, soil pollution, effects and abatements. Air Pollution- Classification, sources and toxic effects of air pollutants. engineered systems for air purification: Atmospheric cleansing process, approaches to contamination control. Noise Pollution – sources & effects.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion.	8
4 (Atmospheric chemistry and Air Pollution)	Population Growth & Explosion. Green house gas effect, Global warming, Climate change, Acid rain, Ozone layer depletion and Photochemical Effect. Environmental legislation of India-Air act-1984, Water act- 1974, Environment Protection act-1986, Forest conservation act-1980, Wild life protection act-1972.	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures,Audio/Video clips, Group discussion.	8
5. (Environment Ethics, Conservation and Waste Management)	Environmental Ethics-(types & theories) and moral values. NGOs and their role in environmental preservation. A case study of Anupam Mishra (Ponds are still relevant, Saaf Maathe Ka Samaj, Rajasthan Ki Rajat Bunden & Paryavaran Ke Path). Solid waste: Generation and waste characterization. Impact on society & management strategies. Swachha Bharat Abhiyan	Lecture with ppt., Diagrams, Flowchart depiction on whiteboard during online/offline lectures, Audio/Video clips, Group discussion. Field visits. Industrial Visit (MSW/BMW/STP/ETP)	8

Part C

<table>
<tr><th>Modules</th><th>Title</th><th>Indicative-ABCA/PBL/ Experiments/Field work/ Internships</th><th>Bloom's Level</th><th>Hours</th></tr>
<tr><td>1</td><td><table><tr><th>S.NO.</th><th>Practical List</th></tr></table></td><td>Experiments</td><td>BL4-Analyze</td><td>30</td></tr>
</table>

1	To understand how to operate the instrument and also know the basic knowledge of indoor air quality (IAQ) monitors. **Hours** **2.0**
2	To measure the ambient concentrations of gases and particulate matter by using Handy Air Sampler (HAS). **Hours** **2.0**
3	To determine the Total Hardness of a given water sample by a complexometric method **Hours** **2.0**
4	To determine the alkalinity of the given water sample **Hours** **2.0**
5	To find out the amount of Dissolved Oxygen (DO) in the given sample of water. **2.0** **Hours**
6	To determine the Biological Oxygen Demand (BOD) of a given water sample. **2.0** **Hours**
7	To determine the strength of calcium ion in the given water sample. **Hours** **2.0**
8	To determine the turbidity of given water samples. **2.0** **Hours**
9	To determine the pH of given water and soil samples. **2.0** **Hours**
10	To determine the TDS and Conductivity of the given water samples. **2.0** **Hours**
11	To analyze the grassland ecosystem and calculate the Important Value Index (IVI) by quadrate method. **Hours** **2.0**
12	To measure the intensity of Noise at different places in the ITM University campus by using Sound Meter. **Hours** **2.0**
13	To measure the intensity of Light at different locations in the ITM University campus by using Light Meter. **Hours** **2.0**

	14 To determine the Sodium and Potassium in the given soil sample by using Flame photometer. **Hours** **2.0**			
2	1. Identify the biodiversity (flora and fauna) at ITM University campus 2. Comparative analysis of indoor and outdoor air quality with in rural and urban premises. 3. Waste to useful products, etc.	PBL	BL3-Apply	60

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	18	40	12

Part E

Books	• Environmental Science by Cuningham and Cuningham; McGraw-Hill Education; 13th edition (16 February 2014) • Environmental Science by B. S. Chauhan; Firewall Media, 2008
Articles	
References Books	• Environmental Engineering by Howards S Peavy, Donald R Rowe, T. George • Environmental Science & Engineering by Gilbert M. Master
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	3	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	4	-	-	-	-	-	-	4	-	-	-
CO4	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	English-2
Course Code	AEC0301[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s	1.Basic Language Proficiency 2.Educational Background 3.Motivation and Willingness to Learn Time Commitment 4.Technology Proficiency			**Co-Requisite/s**	1.Communication Skills Workshop 2.Emotional Intelligence Training 3.Conflict Resolution Seminar 4.Leadership Development Program 5.Cross-Cultural Competency Training 6.Career Development Workshops			
Course Outcomes & Bloom's Level	**CO1-** Determine interpersonal skills and be an effective goal-oriented team player. **(BL1-Remember)** **CO2-** Elaborate creativity and lateral thinking.**(BL2-Understand)** **CO3-** Examine attitudes, emotional intelligence and understand its influence on behavior. **(BL3-Apply)** **CO4-** Justify approaches to conflict resolution**(BL4-Analyze)** **CO5-** Evaluate goal setting, management, decision-making skills.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Module 1	Self Analysis - SWOT Analysis, who am I,Attributes, Importance of Self Confidence,Self Esteem. Interpersonal Skills - Gratitude Understanding the relationship betweenLeadership Networking & Teamwork.Assessing Interpersonal Skills Situation description of Interpersonal SkillTeamwork:Necessity of Team Work Personally, Socially and Educationally	Classroom Lecture, PPts,	10
Module 2	Creativity - Out of box thinking, Lateral Thinking.Leadership - Skills for a Good Leader, Assessment of Leadership Skills	Audio/Video clips, group discussion, lecture with ppt, Review AnalysisAudio Video Mode	6
Module 3	Attitude- Factors influencing Attitude,Challenges, and lessons from Attitude,Etiquette. Emotional Intelligence What isEmotional Intelligence, emotional quotientwhy Emotional Intelligence matters, Emotion Scales. Managing Emotions.	Classroom Lecture, PPts, Videoes	6
Module 4	Motivation - Factors of motivation, Self-talk,Intrinsic & Extrinsic Motivators. ConflictResolution - Conflicts in Human Relations –Reasons Case Studies, Approaches to conflict resolution.	Mind Map	6
Module 5	Goal Setting - Wish List, SMART Goals,Blueprint for success, Short Term, Long Term, Lifetime Goals. Time Management Value of time, Diagnosing Time Management,Weekly Planner To-do list, Prioritizing work.Extempore Decision Making - Importance and necessity of Decision Making, Process and practical way of Decision Making,Weighing Positives & Negatives. Technical Topic Presentation.	Audio/Video clips, group discussion,lecture with ppt, quizLectures, Case Studies, Experiential Learning	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998. ThomasA Harris, I am ok, You are ok, New York-Harper and Row, 1972
Articles	https://www.frontiersin.org/articles/10.3389/feduc.2019.00087/full https://www.cii.co.uk/media/6158020/a-useful-guide-to-swot-analysis.pdf http://www.mmmut.ac.in/News_content/35141tp news_10142020.pdf
References Books	Covey Sean, Seven Habit of Highly Effective Teens, New York, Fireside Publishers, 1998. Carnegie Dale, How to win Friends and Influence People, New York: Simon & Schuster, 1998. Thomas A Harris, I am ok, You are ok, New York-Harper and Row, 1972 Daniel Coleman, Emotional Intelligence, Bantam Book, 2006
MOOC Courses	https://www.edx.org/learn/leadership/catalyst-leading-with-effective-communication-inclusive-leadership-training? hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list https://www.edx.org/learn/writing/university-of-california-berkeley-academic-and-business-writing? hs_analytics_source=referrals&utm_source=mooc.org&utm_medium=referral&utm_campaign=mooc.org-course-list
Videos	https://www.youtube.com/watch?v=fq98P9N9Hbg https://www.youtube.com/watch?v=uA5YeqgsjmYhttps://www.youtube.com/watch?v=eBSeCp__xhI

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	3	-	-	-	2	-	3	-	-	3	2	-
CO2	2	3	-	-	-	-	-	2	-	-	-	-	-	3	-
CO3	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-
CO4	-	2	-	2	-	-	-	3	-	-	-	-	-	3	-
CO5	3	-	3	3	-	3	-	-	-	3	-	-	3	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Computer Networks
Course Code	BSCS0301[T]

Part A

<table>
<tr><td rowspan="2">Year</td><td rowspan="2">2nd</td><td rowspan="2">Semester</td><td rowspan="2">3rd</td><td rowspan="2">Credits</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>3</td><td>0</td><td>1</td><td>4</td></tr>
<tr><td>Course Type</td><td colspan="8">Embedded theory and lab</td></tr>
<tr><td>Course Category</td><td colspan="8">Disciplinary Major</td></tr>
<tr><td>Pre-Requisite/s</td><td colspan="3">Study of computer networks provides basic knowledge of Computer system architecture and various techniques used in it, along with error detection techniques like parity bit etc</td><td>Co-Requisite/s</td><td colspan="4"></td></tr>
<tr><td>Course Outcomes & Bloom's Level</td><td colspan="8">CO1- Remembering the concepts of computer networks, their types.(BL1-Remember)
CO2- Understand to the concept of Class full and Classless addressing Network address Translation, Mobile IP.(BL2-Understand)
CO3- Apply to Unicast and Multicast Routing and Next Generation IP for networking.(BL3-Apply)
CO4- Analyze the applications to address the issues of Networking Technologies.(BL4-Analyze)
CO5- Evaluating to investigate routers, IP and Routing Algorithms in Network Layer(BL5-Evaluate)</td></tr>
<tr><td>Coures Elements</td><td colspan="2">Skill Development ✓
Entrepreneurship ✓
Employability ✓
Professional Ethics ✕
Gender ✕
Human Values ✕
Environment ✕</td><td>SDG (Goals)</td><td colspan="4">SDG4(Quality education)</td></tr>
</table>

Part B

Modules	Contents	Pedagogy	Hours
1	Data Communication System: Purpose, Components: Source, transmitter, transmission System, receiver, and destination. Line Configurations, Signal Representation, Parallel and Serial Data Transmission, Asynchronous and Synchronous Modes of Data Transmission. Digital Signal Encoding, Channel Coding	Lectures with whiteboard/PPT	8
2	Analog and digital data transmission. Data and signal. Analog and digital Signaling of analog and digital data. Modem, Modulation techniques, CODEC, Digital Transmitter etc. Introduction to Network, OSI reference model, TCP/IP reference model. Transmission Media: Magnetic Media, Twisted-Pair cables, Baseband & Broadband Coaxial cables, Fiber Optics. Wireless Transmission: Radio Transmission, Microwave Transmission..	Lectures with whiteboard/PPT	8
3	ISDN; ATM; Data Link Layer: Services, Framing, Error Control, Error-detecting & Correcting Codes. Data Link Protocols: Stop-and-Wait Protocol, Sliding Window Protocol. HDLC; Static & Dynamic Channel allocation in LANs & MANs. Multiple Access Protocols: ALOHA, CSMA/CD	Lectures with whiteboard/PPT	8
4	IEEE standards 102.3 and Ethernet, 102.4: Token Bus; 102.5: Token Ring. Bridges, Routers, Gateways, Routing Algorithm, Congestion control Algorithm, Internetworking, The TCP/IP Protocol ,IP Addressing, Subnets.	Lectures with whiteboard/PPT	8
5	Wide Area Network: Introduction, Network routing, Routing Tables, Types of routing, Dijkstra’s Algorithm, Bellman-Ford Algorithm, Link state routing, Open shortest path first, Flooding, Broadcasting, Multicasting,Internet Protocols, Overview of TCP/IP, Transport protocols, Elements Recorded of Transport Protocol, Transmission control protocol (TCP), User data-gram protocol (UDP).	Lectures with whiteboard/PPT	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Configure to DNS Server	Experiments	BL2-Understand	2
2	Configure to DHCP Server	Experiments	BL2-Understand	2
3	Configure IP routing with RIP using CISCO Packet Tracer	Experiments	BL2-Understand	2
4	Configure to router for one network	Experiments	BL2-Understand	2
5	Configure to two different router	Experiments	BL2-Understand	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	Behrouz A. ; Data Communications and Networking. ForouzanMcGraw-Hill. Andrew S. Tanenbaum; Computer Networks; Pearson Prentice Hall
Articles	
References Books	William J. Beyda Data Communication Prentice Hall William Stallings Data and Computer Communications Pearson Prentice Hall
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Data Structure
Course Code	BSCS0302[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Basic understanding of computer fundamentals and programming in ‘C’.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To Remember Have a comprehensive knowledge of the data structures **(BL1-Remember)** **CO2-** To Understand the importance of data and be able to identify the data requirements for an application**(BL2-Understand)** **CO3-** To apply have a practical experience of algorithmic design and implementation**(BL3-Apply)** **CO4-** To analysis develop projects requiring the implementation of various data structures. **(BL4-Analyze)** **CO5-** To Evaluate Have practical experience of developing applications that utilize data structures;**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Concept of data structure and analysis of algorithm, abstract data structure, introduction to stack and primitive operations on stack, stack as an abstract data type, stack application: infix, prefix, postfix and recursion, introduction to queues, primitive operation on queues, circular queue, de queue, priority queue and applications of queue.	White Board, Group Discussion	8
2	Introduction to linked list, basic operations on linked list, stacks and queues using linked list, doubly linked list, circular linked list, applications of linked list.	White Board, Group Discussion	8
3	Trees-basic terminology, binary trees, tree representations as array and linked list, basic operations on binary tree, traversal of binary trees:- inorder, preorder, postorder. Applications of binary tree, threaded binary tree, AVL tree, binary tree representations of trees	White Board, Group Discussion	8
4	Sequential search, binary search, insertion sort, selection sort, quick sort, bubble sort, heap sort, comparison of sorting methods.	White Board, Group Discussion	8
5	Hash Table, Collision resolution technique, Introduction to graphs, Definition, Terminology, Directed, Undirected and Weighted Graph, Representation of Graph, Graph Traversal-Depth first, Breadth first search, spanning tree, minimum spanning tree, shortest path algorithm.	White Board, Group Discussion	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Write a program to find the factorial of a given no using recursion.	Experiments	BL2-Understand	2
2	Write a program for bubble sorting.	Experiments	BL2-Understand	2
3	Write a program for linear search.	Experiments	BL2-Understand	2
4	Write a program for binary search.	Experiments	BL2-Understand	2
5	Write a program for selection sorting	Experiments	BL2-Understand	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	20	60	30

Part E

Books	Data Structure: By Lipschultz (Schaums Outline Series) Data Structure through C (A Practical Approach) by G.S. Baluja
Articles	
References Books	Fundamental of Data Structure by S. Sawhney & E. Horowitz
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Vector Analysis & Linear Algebra
Course Code	BSMA0301[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Disciplinary Minor							
Pre-Requisite/s	Basic knowledge of Matrix & vectors			**Co-Requisite/s**	Basic knowledge of LI, LD, dot and cross product			
Course Outcomes & Bloom's Level	**CO1-** CO1: To get insight of fundamental knowledge of matrix, group theory and transformations.and basic concept of vector analysis **(BL1-Remember)** **CO2-** CO2: To understand various techniques to solve real life problems through examples. **(BL2-Understand)** **CO3-** CO3: To apply the concepts of matrix, vector space, linear transformation and Gauss theorem , stock theorem , green theorem and other concept of vector analysis on many branches of Physics, Engineering, Social sciences and Mathematics **(BL3-Apply)** **CO4-** CO4To analyze the concept of Gauss theorem , stock theorem , green theorem and other concept of vector analysis .**(BL4-Analyze)** **CO5-** CO5: To evaluate gradient ,divergence ,curl andInverse, Eigen value and Eigen vector of matrix **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Rank and Nullity of matrix, Solution of simultaneous equation by elementary transformation, consistency of equations, Eigen value and Eigen vectors, Calley Hamilton theorem, Inverse matrix, Digonlization.	Audio/Video clips, group discussion, lecture with PPTs, quiz	8
Unit 2	Definition and examples of vector spaces, subspaces, sum and direct sum of subspaces, Linear span, Linear dependence, Independence and their basic properties, Basis, Existence Theorem for basis, Extension theorem, Invariance of the number of elements of a basis, Dimension, Finite dimensional vector spaces, Existence of complementary subspaces of a subspace of a finite dimensional vector space, Dimension of sum of subspaces, Quotient space and its dimension.	Audio/Video clips, group discussion, lecture with PPTs, quiz	8
Unit 3	Linear transformations, Properties of linear transformation, Range and Kernel, The rank and nullity of linear transformations, Rank-Nullity theorem and its consequence, The matrix representation of a linear transformation, change of basic, dual space, bi-dual space and natural isomorphism, adjoint of a linear transformation.	Audio/Video clips, group discussion, lecture with PPTs, classroom presentations, Analysis	8
Unit 4	Scalar and vector product of three vectors, product of four vectors, Reciprocal vectors, vector differentiation, Gradient, Divergence and curl	Audio/Video clips, group discussion, lecture with PPTs, Quiz	8
Unit 5	Vector Integration, Greens Theorem, Stokes Theorems and Gauss divergence Theorem and problems based on them	Audio/Video clips, group discussion, lecture with PPTs, Quiz	8

	Vector Integration, Greens Theorem, Stokes Theorems and Gauss divergence Theorem and problems based on them. **Appliacation of AI in Vector analysis and linear algebra** **Representation of Data** Vectors as Data Points **Operations in AI Models** Matrix Multiplications: **Neural Networks and Optimization** Linear Transformations:		

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
unit 1-5	Application based problem of vector analysis and linear algebra Algebra in the form of project/case study	Case Study	BL3-Apply	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	1. K.B. Datta, Matrix and Linear Algebra, Pratice Hall of India Pvt. Ltd. New Delhi, 2000 2. K. Haffiman and R. Kunze, Linear Algebra, 2nd Edition. Prentice Hall Englewood Cliffs. New Jersey,1971 N. Saran and S. N. Nigam,Introduction to Vector Analysis,Pothishala Pvt. Ltd. Allahabad
Articles	
References Books	1. Marc Lipson and Seymour Lipschutz, Schaum'S Outline Of Linear Algebra, Key College Publishing (Springer – Verlag) 2001 2. S, Kumarsaran, Linear Algebra, A Bermetric Approach Prentice Hall of India, 2000 Shanti Narayan,A Text Book of Vector Calculus,S. Chand & Co. New Delhi
MOOC Courses	https://onlinecourses.nptel.ac.in/noc24_ma13/preview
Videos	https://onlinecourses.nptel.ac.in/noc24_ma04/preview https://onlinecourses.nptel.ac.in/noc24_ee48/preview https://onlinecourses.nptel.ac.in/noc24_ma11/preview

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	2	-	1	-	-	-	-	-	-	-
CO2	3	3	1	3	3	2	-	-	-	-	-	-	-	-	-
CO3	3	2	-	1	3	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	2	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	1	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Optics
Course Code	BSPH0301[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Knowledge of Physics upto BSc first Year(Second semester)			**Co-Requisite/s**	Knowledge of Mathematics upto BSc first Year(Second semester)			
Course Outcomes & Bloom's Level	**CO1-** To remember the basic laws of Optics**(BL1-Remember)** **CO2-** Understand the basic concepts of Optics**(BL2-Understand)** **CO3-** To apply the concepts of Optics to different system. **(BL3-Apply)** **CO4-** To Analyze the laws of Optics**(BL4-Analyze)** **CO5-** To evaluate the laws of Optics**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Unit-I Geometric Optics and its applications: Ray optics, Plane and spherical Mirrors, Lens, image formation, Lens formula, combination of thin lenses and equivalent focal length. Dispersion and dispersive power, chromatic and achromatic aberration, need of multiple lenses in eyepieces, Ramsdens and Huygens eye-piece	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
2	Unit-II Interference: Principle of Superposition, Conditions for sustained interference, Theory of interference, Lloyd's mirror, Achromatic fringes. Interference in parallel and wedge shaped films, Colour of thin films. Newton's rings and Michelson interferometer and their applications. Multiple beam interference in parallel film and Fabry-Perot interferometer.	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
3	Unit-III Diffraction: Frenel's diffraction, Zone plate, diffraction due to straight edge. Fraunhoffer diffraction due to single and double slits, plane transmission grating, Resolving power of grating, telescope and Microscope Diffraction Grating: Diffraction at N-parallel slits Intensity distribution, Plane diffraction grating, Concave grating and its mountings. Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon.	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
4	Unit-IV Polarization: Transverse nature of light waves, Polarization of electromagnetic waves, Plane polarized light – production and analysis, Description of Linear, circular and elliptical polarization. Propagation of em waves in anisotropic media, uniaxial and biaxial crystals, symmetric nature of dielectric tensor, Double refraction, Hygen's principle, Ordinary and extraordinary refractive indices, Fresnel's formula, light propagation in uniaxial crystal, Nicol prism, Production of circularly and elliptically polarized light, Babinet compensator and applications, Optical rotation, Optical rotation in liquids and its measurement through Polari meter.	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
5	Unit-V Lasers and Photo Sensors A brief history of lasers, characteristics of laser light, Einstein prediction, Relationship between Einstein's coefficients (qualitative discussion only), Pumping schemes, Resonators, Ruby laser, He-Ne laser, Applications of lasers, Principle of Holography	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	To find out the Focal length of combination of lenses with Nodal slide experiments	Experiments	BL3-Apply	3
2	To determine the wavelength of Sodium light by using Newtons ring experiments	Experiments	BL4-Analyze	3
3	To determine the wavelength of Laser light by using diffraction grating	Experiments	BL3-Apply	3
4	To determine the specific rotation of Sugar solution by using polarimeter	Experiments	BL3-Apply	3
5	To find the numerical aperture of given fiber	Experiments	BL3-Apply	3

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	

Part E

Books	Fundamental of Optics by N Subramanyam and Brijlal.
Articles	
References Books	(i) Principles of Optics by BK Mathur, (ii) Optics by Ajay Ghatak
MOOC Courses	(i) https://nptel.ac.in/courses/115107131 (ii)https://nptel.ac.in/courses/115107131 (iii) https://nptel.ac.in/courses/115107095
Videos	(i) https://nptel.ac.in/courses/115107131 (ii)https://nptel.ac.in/courses/115107131 (iii) https://nptel.ac.in/courses/115107095

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	1	-	-	-	-	-	-	-	-	-	-
CO2	2	1	3	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	1	3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	1	2	3	2	2	-	-	-	-	-	-	-	-	-	-
CO5	2	1	3	2	2	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Forensic Psychlogy
Course Code	GEC0301[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Generic Elective							
Pre-Requisite/s	Basic Understanding of Human Behavior or Introductory Psychology – To comprehend psychological principles and mental processes relevant to criminal behavior			**Co-Requisite/s**	Logical Reasoning or Data Interpretation – Enables Computer Science/Math students to analyze behavioral patterns, interpret test results (e.g., polygraph), and apply decision-making logic in forensic settings.			
Course Outcomes & Bloom's Level	**CO1-** To recognize forensic psychologists as experts in their field and understand their contributions to legal proceedings**(BL1-Remember)** **CO2-** To Interpret the Mental Health Act 1987 and its implications for individuals with mental disorders in the legal system**(BL2-Understand)** **CO3-** To explain the basics of polygraphy, including the pre-test interview, questioning techniques, and the physiological and physiological stress evaluators**(BL3-Apply)** **CO4-** To analyze the interface between civil and criminal law in relation to people with mental disorders**(BL4-Analyze)** **CO5-** To evaluate the legal concepts of McNaughten rule, diminished responsibility, testamentary capacity, and competency evaluation**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✓ Gender ✓ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG5(Gender equality) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructure) SDG10(Reduced inequalities) SDG16(Peace Justice and strong institutions)				

Part B

Modules	Contents	Pedagogy	Hours
I	**Basics of Forensic Psychology** Introduction, Definition of Forensic Psychology. History and Development of Forensic Psychology, Scenario in India. Scope of Forensic Psychology, Ethics of Forensic Psychology, functions and role of forensic psychologist, Forensic Psychologists as an Expert	Interactive lectures, group discussions, case studies	8
II	**Psychopathology & Abnormal Behavior** Theories of Offending, Gender & Crime, Ethnicity & Crime. Effect of Media, Terrorism & the related psychological aspects	Role-play, media analysis, student-led seminars	9
III	**Elements of Forensic Psychiatry** Forensic Psychiatry: Introduction to different mental illnesses; neurosis (depression, mood disorder, Insanity, Psychosis, Delusion, delirium, schizophrenia), Impulsive control stress disorder, Anti-social personality disorder, psychopathy, Post-traumatic stress disorder and post-partum stress disorder. Substance Abuse; Association between mental disorder and crime; Mc Naughten rule, diminished responsibility, testamentary capacity, competency Evaluation	Clinical case studies, simulations, workshops	9
IV	**Investigative Techniques** **Polygraphy**: Basics of Polygraphy, Polygraphic Examination (the Pre-test Interview and Questioning Technique), Physiological and Physiological Stress Evaluator and their Admissibility in Courts, Merits and Limitations of Polygraphy **Brain Mapping:** Basics of Brain Mapping, Equipment and Procedure of Brain Mapping **Narco-Analysis**: Basics of Narco-Analysis, Requirements and procedure, admissibility in courts, Merits and Limitations of Narco-Analysis	Hands-on demos, guest lectures, field visits	6
V	**Legal Aspects of Forensic Psychology** Relevancy of Psychology in Law, Future of Psychology in Law, Stages of Judicial Process, Mental Health Act 1987, Civil Law and People with Mental Disorders, Criminal Law and People with Mental Disorders	case law analysis, seminars with law faculty	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
II	Maze Experiment	Experiments	BL3-Apply	1
III	Recall Test	Experiments	BL2-Understand	2
III	Recognition Test	Experiments	BL2-Understand	2
III	Serial Learning	Experiments	BL3-Apply	2
III	Retroactive Interference	Experiments	BL4-Analyze	2
III	Proactive Interference	Experiments	BL4-Analyze	4
IV	Reaction Test	Experiments	BL4-Analyze	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
60	18	20	10	20	10
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
60	30	20	10	20	10

Part E

Books	Solomon M. Fulero & Lawrence S. Wrightsman, Forensic Psychology Curt R. Bartol, Anne M. Bartol, Introduction to forensic psychology - Research and Application Irving B. Weiner, Allen K. Hiss, Handbook of Forensic Psychology
Articles	
References Books	Prof. Dr. Vimala Veeraraghavan, Handbook of Forensic Psychology Curt R. Batrol, Anne, M. Batrol, Criminal Behavior: A Psychological Approach Andy Griffiths & Rebecca Milne, The Psychology of Criminal Investigation: From Theory to Practice Costanzo and Krauss, Forensic and Legal Psychology
MOOC Courses	https://onlinecourses.nptel.ac.in/noc25_hs175/preview https://onlinecourses.nptel.ac.in/noc25_hs176/preview https://onlinecourses.swayam2.ac.in/cec25_hs44/preview
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	3	-	3	2	2	-	2	3	-	3
CO2	1	2	-	-	-	3	-	3	-	-	-	2	3	2	3
CO3	3	-	-	-	3	2	-	-	-	2	-	-	2	3	3
CO4	-	3	2	3	-	3	-	2	-	2	-	-	3	-	3
CO5	-	3	-	-	-	3	-	3	-	2	-	2	2	-	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Making in morden india
Course Code	IKS301

Part A

<table>
<tr><td rowspan="2">Year</td><td rowspan="2">2nd</td><td rowspan="2">Semester</td><td rowspan="2">3rd</td><td rowspan="2">Credits</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>2</td><td>2</td><td>0</td><td>4</td></tr>
<tr><td>Course Type</td><td colspan="8">Theory only</td></tr>
<tr><td>Course Category</td><td colspan="8">Indian Knowledge System (IKC)</td></tr>
<tr><td>Pre-Requisite/s</td><td colspan="3"></td><td>Co-Requisite/s</td><td colspan="4"></td></tr>
<tr><td>Course Outcomes & Bloom's Level</td><td colspan="8">CO1- 1. At the end of this course, students would be intellectually well equipped to have a sense of modern Indian history and culture (BL2-Understand)
CO2- 2. The students will have an understanding of making of India as a nation .(BL2-Understand)
CO3- 3. The students will have an understanding of salient features of modern India (BL2-Understand)
CO4- 4. It will help students to develop their personality and thinking horizon for being a good and concerned Indian citizen(BL4-Analyze)</td></tr>
<tr><td>Coures Elements</td><td colspan="3">Skill Development ✕
Entrepreneurship ✕
Employability ✕
Professional Ethics ✕
Gender ✕
Human Values ✓
Environment ✕</td><td>SDG (Goals)</td><td colspan="4">SDG1(No poverty)
SDG4(Quality education)
SDG16(Peace Justice and strong institutions)</td></tr>
</table>

Part B

Modules	Contents	Pedagogy	Hours
1	**Idea of India in historical perspective** **a)** Indian culture, b) cultural commonness, c)cultural diversities, d)unity in diversity, e) culturall accomodations ,f) cultural conflicts, g)Idea of India and British Rule , h) Role of Indian Intelligentsia.	Lectures with white board and or PPT, video clips/films on specific themes/topics, illustrations, classroom discussions	
UNIT02	**Emergence and growth of Indian Nationalism** **a) Anti-colonial basis ,b) Economic Nationalism ,c) communalism and nationalism ,d) revivalism and Indian nationalism ,e)Enlightenment values** **,f)European Nationalism and Indian Nationalism**	Lectures with white board and or PPT, video clips/films on specific themes/topics, illustrations, classroom discussions	
UNIT03	Social Reform Movements a) British Rule and Indian introspection ,b)Raja Rammohan Roy, c) social reform movements in 19th century , d)Swami Vivekanand ,e)The women issue ,f)Caste system	Lectures with white board and or PPT, video clips/films on specific themes/topics, illustrations, classroom discussions	
UNIT04	Indian National Movement a)Early Revolts and 1857 Revolt, b)Early Nationalists ,c) Bang Bhang Movement , d) Gandhi led Mass Movements, e) Socialist and Left trends , f) Princely States and their integration into nation, h)Partition and Independence .	Lectures with white board and or PPT, video clips/films on specific themes/topics, illustrations, classroom discussions	
UNIT05	**India after independence** **a)Making of Indian Constitution ,b) Post Independent Nehru Era , c) India facing Wars , d) Indian econmy- From Planning to** **LPG ,e) Achievements, f) Challenges in 21st century India**	Lectures with white board and or PPT, video clips/films on specific themes/topics, illustrations, classroom discussions	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	1. Bipan Chandra and others: India's Struggle For Independence , Penguine Publishers. 2. Bipan Chandra: History Of Modern India, Orient Blackswan publishers. 3. Sunil Khilnani: The Idea of India, Penguine publishers. 4. Shekhar Bandopadhyay: From Plastic to Partition and After, A History of Modern India, Orient Blackswan publishers. 5. Rakesh Batabyal: The Penguine Book of Modern Indian Speeches,1878 to Present, Penguine Publishers.
Articles	
References Books	6. A R Desai:Social Background of Indian Nationalism, Popular Prakashan . 7. B R Nanda: Mahatma Gandhi ,A Biography,London 8. B.R.Nanda:Gandhi and His Critics, Oxford 9. Girja Shankar: Socialist Trends in Indian National Movement ,Meerut
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	2	-	-	4	-	-	3	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Numerical methods with programming
Course Code	SEC0301[T]

Part A

Year	2nd	**Semester**	3rd	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** CO1: To get insight of fundamental knowledge of numerical methods.**(BL1-Remember)** **CO2-** CO2: To understand various techniques to solve real life problems through examples. **(BL2-Understand)** **CO3-** CO3: To implement various methods over equations, system of equations, Ordinary differential equations and partial differential equations.**(BL3-Apply)** **CO4-** CO4: To analyze behavior of numerical solution of equations.**(BL4-Analyze)** **CO5-** CO5: To evaluate rate of convergence, error of equations based on mathematical techniques.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to numerical computing, Approximation and error in numerical computations, Solution of Equations: Bisection, Secant, Regula Falsi, Newton's method, Iteration method.	Audio/Video clips, group discussion, lecture with ppt, quiz	8
2	Linear equations: direct methods for solving systems of linear equations (Gauss elimination, Gauss Jordan, LU decomposition); Iterative methods (Jacobi, Gauss- Seidel reduction methods).	Audio/Video clips, group discussion, lecture with ppt, quiz	8
3	Interpolation: Newtons forward and backward interpolation, Lagrange interpolation, Divided differences, Interpolation formula using Differences.	Audio/Video clips, group discussion, lecture with ppt, quiz	8
4	Numerical Quadrature, Newton- Cote's Formulae,. Methods based on numerical integration, Methods based on numerical differentiation	Audio/Video clips, group discussion, lecture with ppt, quiz	8
5	Ordinary differential equations: Taylor series method, Picard's method, Euler method, Modified Euler method, d, Runge-Kutta's method,. **Application of AI in numerical methods** Optimization Problems **. Root-Finding and Equation Solvers** Benefits and challenges of AI in numerical methods **Experiential learning:** Application based problem of Numerical method in the form of project/case study.	Audio/Video clips, group discussion, lecture with ppt, quiz	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	**1.Root Finding Methods** **2.Solution of Linear Algebraic Equations** **3. Interpolation Techniques** **4. Numerical Differentiation** **5. Numerical Integration** **6. Solution of Ordinary Differential Equations (ODEs)**	Experiments	BL4-Analyze	10

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	S. S. Sastry, Introductory Methods of Numerical Analysis PHI Learning Pvt. Ltd. B.S. Grewal, Higher Engineering Mathematics Khanna Publishers
Articles	
References Books	Balaguruswamy Numerical Methods Tata McGraw Hill Publication, New York. M.K.Jain, S.R.K.Iyengar and R.K.Jain,Numerical Methods for Scientific and Engineering Computation New Age International Publishers T. Veerajan and T. Ramachandran Theory and Problems in Numerical Methods McGraw Hill Education
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Hindi Language and Moral Values-II
Course Code	AEC0401[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Foundation core							
Pre-Requisite/s	Bhasha gyan			**Co-Requisite/s**	shabd gyan , varn gyan, samajik samaj			
Course Outcomes & Bloom's Level	**CO1-** हिंदी भाषा एवं नैतिक मूल्यों को समझना**(BL1-Remember)** **CO2-** सांस्कृतिक ,एवं राष्ट्रिय एकता।।**()** **CO3-** भाषा अध्ययन एवं अध्यापन का उद्देश्य विद्यार्थियों के सर्वांगीण विकास में सहायक है। छात्र जीविकोपार्जन के लक्ष्यों का सहज संधान कर सके । जीविकोपार्जन के लक्ष्यों का सहज संधान कर सके । **()** **CO4-** पाठ्यक्रम में व्याकरण ,सामान्य तथा पारम्परिक साहित्य , लेखन परम्परा का बोध करना एवं समग्र व्यक्तित्व का विकास करना है। **()**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being)				

Part B

Modules	Contents	Pedagogy	Hours
1	वर्ण-विन्यास - डॉ विश्वनाथ मिश्रसांकृत्यायन पत्थर (कविता) - सूर्यकांत त्रिपाठी निराला दिमागी गुलामी (निबंध) - राहुल ह तोड़ती व	Audio/Video clips, group discussion, lecture with ppt, quiz	5
2	नारीत्व का अभिशाप (निबंध) -महादेवी वर्मा चीफ की दावत (कहानी) - भीष्म साहनी विराम चिन्ह (संकलित)	Audio/Video clips, group discussion, lecture with ppt, quiz	4
3	चली फगुनहट बौरे आम (ललित निबंध) - विवेकी राय इंद्रधनुष का रहस्य (वैज्ञानिक लेख) - डॉ कपूरमल जैन संधि (संकलित)	Audio/Video clips, group discussion, lecture with ppt, classroom presentations	5
4	सपनो की उड़ान (प्रेरक निबंध) - ए पी जे अब्दुल कलाम हमारा सौर मंडल (संकलित) प्रमुख वैज्ञानिक अविष्कार और हमारा जीवन (संकलित) समास-संरचना और प्रकार (संकलित)	Audio/Video clips, group discussion, lecture with ppt, classroom presentations	4
5	शिकागो व्याख्यान (व्याख्यान) - स्वामी विवेकानंद धर्म और राष्ट्रवाद (लेख) - महर्षि ऑरबिंदो सादगी (आत्मकथा) -महात्मा गाँधी चित्त जहां भयविहीन (कविता) - रबिन्द्र टैगोर	Audio/Video clips, group discussion, lecture with ppt	5

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	40	12	60	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	evm sha Hindi bhasha naitik mulayha
Articles	
References Books	evm sha Hindi naitik mulayha
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	1	-	-	-	3	-	-	-	-	-	-
CO2	-	-	3	-	-	-	2	1	-	-	-	-	-	-	-
CO3	-	1	-	-	2	-	-	-	2	-	-	-	-	-	-
CO4	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO5	-	-	-	1	-	2	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Object Oriented Programming Concept using C++
Course Code	BSCS0401[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Students should have basic as well as practical knowledge of Programming and should be familiar with the concept of C.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To Remember the basics of C Programming Knowledge.**(BL1-Remember)** **CO2-** To Understand the concept of object oriented programming **(BL2-Understand)** **CO3-** To apply the various techniques for problem solving and will implement those ideas using C++ programs.**(BL3-Apply)** **CO4-** To analysis of C++ streams, Inheritance and Operator Overloading.**(BL4-Analyze)** **CO5-** To evaluate the aim of teaching this course is that students should have conceptual and practical knowledge of Object oriented methodology.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Concepts of object oriented programming, Need of Object Oriented Programming, Characteristics of OOP: Classes & Objects, Inheritance, Data Hiding, Encapsulation, Polymorphism, Overloading, Classes and Structures, Classes and Unions Overview of C++, Compiling & Debugging C++ Program, Basics : Preprocessor Directives, Header files, Input and Output Streams, Cout, Cin, Comments, Type Casting. Creating class, Data member, member function. Creating objects and accessing member function through objects.	White Board, Group Discussion	8
2	C++ streams, Formatted I/O: Formatting using the ios members, Setting and clearing the format flags, using manipulators to format I/O, Creating your own manipulators. Introduction to Constructor, Parameterized constructor, Multiple constructors, Default arguments constructor, Copy constructor, Destructor. Friend function, Friend classes, Inline function, Scope resolution operator, Static class members: Static data member, Static member function, passing objects to function, Returning objects, Object assignment.	White Board, Group Discussion	8
3	Function overloading, Function Signature. Overloading constructor function, finding the address of an overloaded function Operator Overloading: Overloading Unary Operators, Operator Keyword, Operator Arguments, Overloading Binary Operators: Arithmetic Operators, Concatenating Strings, Comparison Operators, Assignment Operators, Overloading Using friend function, Overloading Special Operators: New, Delete, <<.	White Board, Group Discussion	8
4	Inheritance: Base & Derived class, Accessing Base Class Member, Specifying Derived Class, Protected Specifier, Overriding Member Function. Virtual Functions, Pure Virtual Functions, Virtual Base Class, Late Binding, this pointer, Accessing Member data with this pointer. Abstract base class, Public and Private Inheritance, Levels of Inheritance.	White Board, Group Discussion	88
5	Containership: Classes within Classes Pointers: Address of Operator &, Pointer variable, Pointers and Arrays, Pointers and Functions, passing variables, Arrays, Pointer and Strings, Memory Management using new and delete, pointers to Objects: reference to members. Exception handling in CPP: types of exception handling. Command Line Arguments.	White Board, Group Discussion	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1		Experiments	BL2-Understand	
2		Experiments	BL2-Understand	
3		Experiments	BL2-Understand	
4		Experiments	BL2-Understand	
5		Experiments	BL2-Understand	
6		Experiments	BL2-Understand	
7		Experiments	BL2-Understand	
8		Experiments	BL2-Understand	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	30	40	20

Part E

Books	Object Oriented Programming C++ C++
Articles	
References Books	R. Lafore E. Balguruswamy
MOOC Courses	
Videos	https://www.youtube.com/watch?v=wN0x9eZLix4

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	4	-	4	-	-	-	-	-	-	-	4	-	-	-
CO5	-	-	-	-	5	-	-	-	-	-	-	-	5	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Computer system organization
Course Code	BSCS0402[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					3	0	0	3
Course Type	Theory only							
Course Category	Disciplinary Major							
Pre-Requisite/s	An Attendee of this course must be familiar with the following ❖ Digital Logic Gates ❖ Basic Computer Architecture ❖ Computer Number Systems			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Remembering : Basic computer architecture (Von Neumann Model) and functions of its various units **(BL1-Remember)** **CO2-** Understanding: Understand the basic operations of digital computer system, its microoperations .**(BL2-Understand)** **CO3-** Applying: Identify, compare and assess to Bus and memory, Register transfer logic and arithmetic operations, Summarize the types of micro operations.**(BL3-Apply)** **CO4-** Analyzing: different types of addressing modes, various types of IO mapping techniques .**(BL4-Analyze)** **CO5-** Evaluating: the performance issues of cache memory and virtual memory**(BL5-Evaluate)** **CO6-** Create and design various hardware and software logics to make a computer system like ALU, Memory, Bus, etc.(Design)**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Register Transfer Language & micro-operations: Overview of Register Transfer Language & microoperations, Classification of Micro operations, Design of arithmetic, Logic and shift micro-operations.	Lectures with whiteboard/PPT, Recorded video/interactive videos, quiz	8
2	Architecture of a Processor: Von Newman architecture, Concept of ALU, Control Unit, Registers : Instruction Register, Control Word, Program Counter, Stack Organization, instruction set, instruction formats, addressing modes, instruction cycle, Interrupt and Interrupt cycle	Lectures with whiteboard/PPT, Recorded video/interactive videos, Quiz ,Group discussion	8
3	I/O Organization: Various I/O Devices, Data Transfer Mode: Program Controlled, Interrupt driven, DMA(Direct Memory Access).	Lectures with whiteboard/PPT, Recorded video/interactive videos, Quiz ,Group discussion	8
4	Memory organization-I: Definition, Memory Hierarchy System, Classification of memory: Primary Memory, Secondary Memory, Basic cells of RAM & ROM , Building large memories using chips.	Lectures with whiteboard/PPT, Recorded video/interactive videos, Quiz ,Group discussion	8
5	Memory organization-II: Concept of Associative memory, cache memory organization, virtualmemory organization	Lectures with whiteboard/PPT, Recorded video/interactive videos, Quiz ,Group discussion	8

Part C

ITM UNIVERSITY
GWALIOR • MP • INDIA
"CELEBRATING DREAMS"

Project Base Learning
Computer System Organization
BCA 301

S.no	Activity Details	Outcomes of the Activity
1	Overview of Register Transfer Language & micro-operations, Classification of Micro operations,	This activity help to study for better understanding of computer hardware operation.
2	Design of arithmetic, Logic and shift micro-operations.	This activity help to understanding of Logic and Shift micro-operations.
3	Architecture of a Processor, Concept of ALU, Control Unit, Registers Instruction Register, Control Word, Program Counter, Stack Organization, instruction set, instruction formats, addressing modes, instruction cycle, Interrupt and Interrupt cycle	This activity help to understanding various function of Computer Hardware.
4	Data Transfer Mode, Program Controlled, Interrupt driven, DMA (Direct Memory Access).	This activity will help to understanding the various Activity perform by Data Transfer and DMA.
5	Memory organization, Concept of Associative memory, cache memory organization, virtual memory organization	This activity will help to understanding the Memory Management in Computer Hardware etc.

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Hayes, J. P. (2017). Computer System Architecture. McGraw Hill. Stallings, W. (2022). Computer Organization and Architecture. Prentice Hall.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2	-	2
CO2	1	2	-	-	2	-	-	-	-	-	-	-	2	3	3
CO3	3	1	-	-	2	-	-	-	-	-	-	-	3	3	3
CO4	-	1	1	2	1	-	-	-	-	-	-	-	2	2	3
CO5	-	1	-	-	1	-	-	-	-	-	-	-	2	2	2
CO6	3	1	-	-	-	-	-	-	-	-	-	-	2	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Advance Calculus and Partial Differential equations
Course Code	BSMA0401[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Disciplinary Minor							
Pre-Requisite/s	Basics Differentiation , Integrations, , Continuity ,convergence and divergence of Sequence and Series ,partial differentiation			**Co-Requisite/s**	Function,, Limit , Sequence and Series and derivative			
Course Outcomes & Bloom's Level	**CO1-** To remember basic concept of Real Analysis ,Partial Differentiationwhich used in various problems of sciences. **(BL1-Remember)** **CO2-** To understand and identify the Convergence of sequences various test for convergence of sequences , limit ,continuity and differentiability of function partial differentiation, Envelops , maxima and minima , Double and Triple Integral volume and surface of solids.also**(BL2-Understand)** **CO3-** To apply the concept of limit continuity and differentiability partial differentiation ,Taylors theorem , LaGrange's method , double and triple integrals to solve various problems of physical and allied sciences**(BL3-Apply)** **CO4-** To analyze and draw connection among the ideas of LaGrange's theorem and Beta Gama function , volume and surface and there properties to solve various problems of physical and allied sciences also Analyze behavior of the solution of the well-defined problems of differentiation **(BL4-Analyze)** **CO5-** To evaluate Double and Triple integral , Partial differentiation , Convergence of series also identifying and provide the various applications related to them also **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
UNIT01	Definition of a sequence, , Bounded and monotonic sequences, Theorems on limits of sequences, Cauchy's convergence criterion, series of non-negative terms, comparison test, Cauchy's integral test, Cauchy's root test, Ratio tests, Raabe's tests, Logarithmic tests, Alternating series, Leibnitz's test, Absolute and Conditional convergence	Audio/Video clips, group discussion, lecture with PPTs, quiz	10
UNIT02	imit and continuity of functions of two variables, Partial differentiation, Change of variables, Euler's theorem on homogeneous functions, Taylor's theorem for functions of two variables, Jacobins,, Maxima and Minima of functions of two variables	Audio/Video clips, group discussion, lecture with ppt	10
UNIT03	Beta and Gama function ,Double and triple integrals, Volumes and surfaces of solids of revolution, Change of order of integration in double integrals.	Audio/Video clips, group discussion, lecture with PPTs, classroom presentations, Analysis	10
UNIT04	Partial differential equations of the first order, Lagrange's solution, Some special types of equations which can be solved easily by methods other than the general method, Charpit's general method	Audio/Videoclips, group discussion, lecture with PPTs, Quiz	8

UNIT05	Partial differential equations of second and higher orders, Classification of partial differential equations of second order, Homogeneous and non-homogeneous equations with constant coefficients, Partial differential equations reducible to equations with constant coefficients. • **AI methods like neural networks are applied to solve ordinary and partial differential equations** **Physics-Informed Neural Networks (PINNs):** These incorporate known physics laws (encoded as differential equations) into the loss function to approximate solutions to PDEs. **Symbolic AI Solvers:** Systems like WolframAlpha or AI-based mathematical tools use symbolic computation to analytically solve differential equations. **Reinforcement Learning (RL):** RL can optimize numerical solvers or explore efficient strategies to approximate solutions	Audio/Video clips, group discussion, lecture with PPTs, Quiz	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
unit 1-5	Application based problem of Advanced Calculus and Partial Differential equation in the form of project/case study	Case Study	BL3-Apply	

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	R. R. Goldbeg,Real Analysis,Oxford & I. B. H. Publishing Co. New Delhi Sharma and Gupta ,Integral Transform,Pragati, Prakashan Meerut
Articles	
References Books	D. Soma Sundaram and B. Choudhary,A first Course in Mathematical Analysis,Narosa Publishing House, New Delhi, 1997 D. A. Murray,Introductory Course in Differential Equation,Orient Longman, India, 1967.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	-	-	2	2	-	2	-	-	-	-	1	-	1
CO2	3	3	1	3	3	2	-	1	-	1	-	-	2	-	2
CO3	3	2	-	1	3	-	-	-	-	-	-	-	1	3	2
CO4	3	2	-	2	-	-	-	-	-	-	-	-	-	3	1
CO5	2	1	-	1	-	-	-	-	-	-	-	-	-	2	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Electricity and Magnetism
Course Code	BSPH0401{T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	Knowledge of Physics upto III Semester			**Co-Requisite/s**	Knowledge of Calculus			
Course Outcomes & Bloom's Level	**CO1-** To remember the basic laws of Electricity and Magnetism**(BL1-Remember)** **CO2-** Understand the basic concepts of Electricity and Magnetism**(BL2-Understand)** **CO3-** To apply the concepts of Electricity and Magnetism to different system. **(BL3-Apply)** **CO4-** To Analyze the laws of Electricity and Magnetism**(BL4-Analyze)** **CO5-** To evaluate the laws of Electricity and Magnetism**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Unit-I Vector Calculus : Differentiation of vectors, scalar and vector fields, conservative fields and potentials, line integrals, gradient of a scalar field, divergence of a vector field and divergence theorem, curl of a vector field and its physical significance, Stokes' theorem, combination of grad, div and curl	Audio/Video clips, group discussion, lecture with ppt, on white board, quiz	8
2	Unit- II Electric Field and Electric Potential: Electric field, electric field lines electric flux Gauss law with applications to charge distributions with Spherical, Cylindrical and Planer symmetry. Conservative nature of electrostatic field, electrostatic Potential, Potential and electric field of a dipole Force and Torque on a diploe	Audio/Video clips, group discussion, lecture with ppt, on white board	8
3	Unit-III Electrostatic energy and Capacitance of a System Electrostatic energy of system of charges, Electrostatic energy of a charged sphere, Conductors in an electrostatic field, Surface charge and force on a conductor, Capacitance of a System of charged conductors, Parallel plate capacitor	Audio/Video clips, group discussion, lecture with ppt, on white board	8
4	Unit-IV Magnetic Field Magnetic force between current elements and definition of magnetic field B Biot Savart's Law and its application to straight wire and circular loop. Dipole Moment and its analogy with electric dipole Ampere's Circuital law and its application to Solenoid.	Audio/Video clips, group discussion, lecture with ppt, on white board	8
5	Unit-V Electromagnetic Induction and Electrical Circuits Faraday's Law, Lenz's law, Self and Mutual Inductances Introduction to Maxwell equation charge conservation and displacement current. Electrical Circuits: Kirchhoff's law Complex reactance and impedance series and parallel LCR Circuit:: (1) Resonance (2) Power dissipation (3) Quality factor and (4) Band width	Audio/Video clips, group discussion, lecture with ppt, on white board	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Series Resonance for Different values of resistances, capacitances, Inductances and plotting of resonance curves and Q factor.	Experiments	BL4-Analyze	3
2	Measurement of Q factor for both Parallel resonances.	Experiments	BL2-Understand	3
3	To verify Kirchoff's Current and Voltage Law for D.C. Circuit	Experiments	BL2-Understand	3
4	To determination the resistance per unit length using Carey Foster's bridge wire.	Experiments	BL4-Analyze	3
5	To determine the value of unknown resistance using post office box.	Experiments	BL2-Understand	3

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	

Part E

Books	Electricity and Magnetism and Electromagnetic Theory by S Mahajan and Choudhury
Articles	
References Books	Introduction to Electrodynamics by D J Griffith
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	2	-	2	-	-	-	-	-	-	-	-
CO2	2	3	2	2	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	3	1	-	1	-	-	-	-	-	-	-	-
CO4	1	1	3	2	3	-	-	-	-	-	-	-	-	-	-
CO5	3	2	1	1	1	-	3	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Basic Concept of Pharmacutical chemistry
Course Code	GEC0401[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Generic Elective							
Pre-Requisite/s	Student should have basic knowledge of organic chemistry			**Co-Requisite/s**	Basic Organic Chemistry – Understanding functional groups, reaction mechanisms. Inorganic Chemistry – Essential for understanding drug salts and metal-based drugs. Biochemistry – To grasp how drugs interact with biological systems. Human Physiology – Knowledge of body systems helps in understanding pharmacodynamics and pharmacokinetics. Analytical Chemistry – Techniques to analyze purity, potency, and formulation. Basic Mathematics – Required for dosage calculations and reaction kinetics.			
Course Outcomes & Bloom's Level	**CO1-** Understand the basic concept about pharmaceutical chemistry**(BL1-Remember)** **CO2-** Learn synthetic procedures, modes of action, uses, and structure-activity relationships (SAR) of specific drugs**(BL2-Understand)** **CO3-** Classify drugs based on therapeutic classes, drug targets, mechanism of action, drug metabolism, and concepts of pro-drugs**(BL3-Apply)** **CO4-** Explain the activities of pharmaceutical compounds**(BL4-Analyze)** **CO5-** Demonstrate the concept of drug metabolism and pharmacokinetics in human body. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✓ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG4(Quality education) SDG12(Responsible consuption and production) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
Module 1	**Pharmaceutical Chemistry -** • Introduction to pharmacy; Career in Pharmacy • Codes of Pharmaceutical ethics • Importance of Pharmaceutical chemistry • Documentation and maintenance of records in the Pharmaceutical industry, Intellectual property right (IPR) in Pharmaceutical industry Patents, trademarks, copyright; The Patent Act: Pharmaceuticals in India	Lecture Method, Storytelling/Case Studies,Concept Mapping,Demonstration/Simulation	7hrs
Module 2	**Pharmacognosy** – • Introduction; History of Pharmacognosy; • Scope and development of Pharmacognosy; • Classification and sources of drugs-classification of drug • Sources and uses of natural drug products biological (plants, animals & microbe), geographical, (marine and mineral sources)	Lecture-cum-Discussion,Molecular Visualization Tools,Case-Based Learning (CBL),Comparative Charts	8 hrs
Module 3	**Molecular Modeling and Drug Designing** • Introduction; Drug design and development: an overview, analogues and prodrugs; • Structure and activity relationship between chemical (SAR), • Factors governing drug design, approaches to drug design : receptor site theory; • Combinatorial synthesis in drug discovery • Factors affecting bioactivity-quantitative structure activity relationship (QSAR)	Mind Mapping / Flowcharts, Concept-Based Learning,Analogies & Models	10 hrs
Module 4	**Spectral analysis of Drugs** • Electromagnetic Radiation, • Spectral Range. Absorbance, Absorptivity, Molar Absorptivity, • Fundamental laws of Absorption, Lambert-Beer law, and its Limitations. • Constitution & Working of Photometer, Spectrometer, Colorimeter.	Interactive Diagrams/Flowcharts, Lecture-cum-Discussion, Animated Videos/Simulations.	8hrs
Module 5	**Molecular analysis**	Integrated Approach, Lecture-cum-Demonstration,Case-Based Learning (CBL)	8hrs

	• Molecular Vibrations, • Hooke's law, • Selection Rules, • Intensity and Position of IR Bands. • Measurement of IR spectrum, • Finger Print Region, • Characteristic Absorption of Various Functional Groups, • Interpretation of IR Spectra of Simple Organic Compounds		

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	**Suspension, Emulsion and Ointment** • To prepare magnesium hydroxide suspension (I.P.) • To prepare liquid Paraffin Emulsion. • To prepare pharmaceutical buffer and to study its theoretical and calculated pH.	Experiments	BL6-Create	6hrs
Module 2	**Isolation of Crude Oil** • To identify the given crude drug (Bark) by macro, microscopic, organoleptic and chemical examination • To identify the given crude drug (Green Leaves) by macro, microscopic, organoleptic and chemical examination. • To identifythe given crude Basil • To describe the morphology of Ginger	Experiments	BL6-Create	8hrs
Module 3	**Preparation of Pharmaceutical Compounds** • To prepare Ferrous ammonium sulphate in lab • To prepare acetanlinide	Experiments	BL6-Create	4 hrs

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60		40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12

Part E

Books	G.R. Chatwal, Pharmaceutical Chemistry Inorganic Vol. 1. Himalaya Publishing House, Mumbai Dr. J.L. Jain, Fundmentals of Biochemistry, S. Chand & Company Ltd. New Delhi. F.S.K. Barar, Essentials of Pharmacotherapeutics, S.Chand & Company Ltd. New Delhi. R.S. Gaud & Dr. G.D. Gupta, Practical Pharmaceutics, CBS Publishers and Distributors, New Delhi. N.C. Choudhary and N.K. Gurbani, Pharmaceutical Chemistry, Vallabh Prakashan, Delhi. N.K. Jain, Textbook of Professional Pharmacy Vallabh Prakashan, Delhi.
Articles	“Basic Concepts in Pharmaceutical Chemistry” by Campos Rosa & Camacho Quesada (2024) “Basic Concepts in Medicinal Chemistry” (ASH-sponsored review/textbook)
References Books	B.M. Mithal. Text books of Pharmaceutical formulation. Vallabh Prakashan, Delhi. Stenlake & Beckett, Practical Pharmaceutical Chemistry Part 1, CBS Publishers and Distributor’s New Delhi.
MOOC Courses	MOOC Swayam Basics of pharmaceutical chemistry https://archive.nptel.ac.in/courses/104/105/104105120/
Videos	https://archive.nptel.ac.in/courses/104/106/104106106/ https://archive.nptel.ac.in/courses/104/105/104105120/ https://coeruniversity.ac.in/course/master-of-science-msc-in-pharmaceutical-chemistry

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	-	2	-	-	-	3	3	-	3	1	1	2
CO2	1	-	1	-	-	-	-	2	-	3	3	-	-	1	1
CO3	1	-	1	3	-	-	2	-	-	-	-	2	1	1	2
CO4	1	1	1	-	3	-	-	-	3	3	2	-	-	2	2
CO5	1	1	1	-	-	-	-	-	2	-	-	-	1	-	3
CO6	1	1	1	-	-	2	-	2	-	3	-	-	-	2	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Disastrer Managment
Course Code	SEC0401[T]

Part A

Year	2nd	**Semester**	4th	**Credits**	L	T	P	C
					2	0	0	2
Course Type	Theory only							
Course Category	Community Enganement and Service							
Pre-Requisite/s	To be familiar with the basics of natural disasters as well as anthropogenic factors and various approaches for disaster managements.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To learn types of disasters and its profile in India**(BL1-Remember)** **CO2-** To understand the causes and impacts of disasters on environment and related case studies of Global and National disasters.**(BL2-Understand)** **CO3-** To learn about risk reduction approaches of disasters with safety issues in mitigating industrial disasters.**(BL3-Apply)** **CO4-** To understand the concept of Disaster Management Cycle and its Risk Reduction Measures**(BL4-Analyze)** **CO5-** To apply the National Acts and policies for mitigating disasters, Role of Army, Police, Community, Corporate, Media etc. for post Disaster Management.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✓		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG10(Reduced inequalities) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
1	Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks, Capacity buildings) Factors of disasters, Global trends in disaster: urban disasters, pandemics, complex emergencies, Climate change	lecture method, collaborative learning, group dicussions, field visit,	8
2	Classification of disaster: geophysical, hydrological, climatological, meteorological, biological and technological or man-made hazards. Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc. Differential impacts- in terms of caste, class, gender, age, location, disability.	lecture method, collaborative learning, group dicussions, field visit,case studies	8
3	Disaster management cycle – Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA).	lecture method, collaborative learning, group dicussions, field visit,case studies	8
4	Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources	lecture method, collaborative learning, group dicussions, field visit,case studies	8
5	Disaster Management Indian scenario, India’s vulnerability profile, Disaster Management Act 2005 and Policy guidelines, Environmental Legislation for Disaster Risk Management in India. Role of information technology in protecting environment and health. Role of NGOs Cases Studies: Bhopal Gas Disaster, Gujarat Earth Quake, Orissa Super-cyclone, South India Tsunami, Bihar floods, Plague Surat, COVID-19 pandemic	lecture method, collaborative learning, group dicussions, field visit,case studies	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1	Contemporary Disaster Issues in India & World	Case Study	BL4-Analyze	4
2	Disaster Mitigation Methods & Involvement of Technologies	Seminar	BL3-Apply	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	• Singhal J.P. “Disaster Management”, Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423 • Tushar Bhattacharya, “Disaster Science and Management”, McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361] • Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011 • Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010. • Kapur, Anu & others, 2005: Disasters in India Studies of grim reality, Rawat Publishers, Jaipur
Articles	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3105552/
References Books	• Coppola P Damon, 2007. Introduction to International Disaster Management, Carter, Nick 1991. Disaster Management: A Disaster Manager's Handbook. • Cuny, F. 1983. Development and Disasters, Oxford University Press. Document on World Summit on Sustainable Development 2002. • Govt. of India: Disaster Management Act 2005, Government of India, New Delhi. Government of India, 2009. National Disaster Management Policy. • Disaster Management Guidelines. GOI-UNDP Disaster Risk Reduction Programme (2009-2012. • Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California, EMSA no.214, June 2003 • National Institute of Disaster Management • National Disaster Management Authority • http://nidm.gov.in, http://cwc.gov.in , http://ekdrm.net , http://www.emdat.be , http://www.nws.noaa.gov , http://pubs.usgs.gov , http://nidm.gov.ini http://www.imd.gov.ini
MOOC Courses	https://nptel.ac.in/courses/124107010
Videos	https://nptel.ac.in/courses/124107010

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	1	3	3	3	1	2	3	1	3	2	3
CO2	1	1	2	3	1	3	3	3	2	1	3	2	1	1	2
CO3	3	3	2	1	3	3	2	1	1	3	2	2	3	2	2
CO4	3	3	3	3	2	2	3	3	1	1	3	2	3	3	2
CO5	3	3	2	2	1	3	3	3	1	1	3	2	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Web Designing with PHP
Course Code	BSCS0501[T]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember various Web Development Strategies using PHP and syntax rules of web Programming**(BL1-Remember)** **CO2-** To understand the basics of web architecture, Development techniques, knowledge about file system.**(BL2-Understand)** **CO3-** To implement: HTML, JavaScript and Arry, strings, database connectivity to create Web applications.**(BL3-Apply)** **CO4-** To analyze various Server-side programming techniques and OOPS Techniques**(BL4-Analyze)** **CO5-** To evaluate and improve the performance of the web application with the help of session handling Techniques**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introducing PHP – history and Basic development Concepts, PHP delimiters, creating user-defined variables, data types with PHP, type casting – Creating first PHP Scripts, declaring and using constants, Using Variable and Operators, – Storing Data in variables -Setting and Checking variables Data types, comments with php, useful readymade function of PHP. Controlling Program Flow: making decisions with if, else, and switchwriting More Complex Conditional Statements – Repeating Action with Loops and super global variables.	Lectures with whiteboard/PPT, Recorded video/interactive videos	8
2	Use of HTML for web design and JavaScript-, html scripts and form elements, embedding php with HTML, redirecting web pages, adding dynamic content using Java script, Working with Numeric Functions. Working with Arrays: Storing Data in Arrays –Numerically index array, associative and multi-decisional, array Processing Arrays with Loops and Iterations – Using Arrays with Forms - Working with Array Functions, Array sorting, converting array to scalar variables – Working with Dates and Times	Lectures with whiteboard/PPT, Recorded video/interactive videos	8
3	String Handling: formatting strings, joining and splitting a string comparing strings matching and replacing substrings, string functions, introduction of php regular expression. Exception Handling: exception handling structure, try…catch…throw Introduction to file system- file system and uses, saving program data for later use for file system, opening a file, creating and writing to a file closing a file and deletion operation on file, reading data from a file, file handling functions. Processing Directories.	Lectures with whiteboard/PPT, Recorded video/interactive videos	8
4	Using PHP Functions and Classes: Introduction to functions. Creating userdefined function parameters, returning values, calling by values versus calling by reference, using include () and require () functions. Creating PHP Classes – Using Advanced OOP Concept, creating a PHP class, object, methods, operations, class attributes, class method invocation, php static hinting, object cloning, inheritance, final keyword, php abstract class, and interface.	Lectures with whiteboard/PPT, Recorded video/interactive videos	8
5	Working with Database: working on MYSQL database, connection PHP with MySQL, creating database tables, implementing insert delete, update and select query using PHP script,	Lectures with whiteboard/PPT, Recorded video/interactive videos	8

Part C

PBL TOPICS

PHP

1. **Simple CMS (Content Management System):**
- Build a basic CMS using PHP where users can create, edit, delete, and manage content (e.g., articles, blog posts).
- Include features like user authentication, role-based access control, and a WYSIWYG editor for content creation.

2. **Online Quiz System:**
- Develop an online quiz application where users can take quizzes on various topics.
- Implement features such as user registration, quiz creation, multiple-choice questions, scoring, and result display.

3. **Online Task Management System:**
- Create a task management application where users can create tasks, assign them to others, set deadlines, and track progress.
- Include features like user authentication, task categorization, priority levels, and status updates.

4. **E-commerce Website:**
- Build a simple e-commerce platform using PHP where users can browse products, add them to cart, and make purchases.
- Implement features like user registration, product catalog, shopping cart functionality, and payment integration (e.g., PayPal).

5. **OnlineStudent Information System:**
- Develop a student information system for managing student records, course details, grades, and attendance.
- Include features such as user authentication, student enrolment, course registration, and grade management.

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	VIKRAM VASWANI PHP A Beginner’s Guide Tata McGraw-Hill
Articles	Steven Holzner The PHP Complete Reference – Tata McGraw-Hil
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	1	2	-	-	-	-	-	-	-	1	2	1
CO2	2	2	-3	2	1	-	-	-	-	-	-	-	2	2	2
CO3	2	1	1	1	3	-	-	-	-	-	-	-	1	2	1
CO4	1	2	-1	2	2	-	-	-	-	-	-	-	2	2	1
CO5	2	2	2	1	2	-	-	-	-	-	-	-	1	2	1
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Discrete structure
Course Code	BSMA0501[T]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	0	0	3
Course Type	Theory only							
Course Category	Disciplinary Minor							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** CO1:To get insight of basic concepts Set, Relation, and Graph Theory.**(BL1-Remember)** **CO2-** CO2: To learn concept of lattice, Logical connectives, Simultaneous Linear equations. **(BL2-Understand)** **CO3-** CO3: To implement various methods over sets, Graph theory and equations**(BL3-Apply)** **CO4-** CO4: To analyze behavior of sets, function and solution of equations. (BL4) **(BL4-Analyze)** **CO5-** CO5: To evaluate application part of Boolean algebra, and graph theory . (BT5)**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	**Set Theory:** Set, Singleton set, Finite and Infinite sets, Subsets, Proper subsets, Equality of sets, Union, Intersection and Difference of sets, Universal set, De Morgan laws, Symmetric difference of sets	Audio/Video clips, group discussion, lecture with PPTs, quiz	8
Unit 2	**Relations:** Cartesian product of sets, Relation between two sets, Binary relation on a set, Types of binary relations, equivalence relation, Composition of relations. **Partial order relations and lattices:** Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices as an Algebric Systems, Principle of Duality, Basic Properties, Sub lattices, Distributed & Complemented Lattices	Audio/Video clips, group discussion, lecture with PPTs, quiz	8
Unit 3	**Boolean algebra:** Definition and properties of Boolean algebra, a brief introduction to the application of Boolean algebra to switching theory, conversion of complicated switching circuits to simple one. **Boolean function**: Definition and Types of Boolean Functions, Disjunctive and Conjunctive normal forms, Logic Gates.	Audio/Video clips, group discussion, lecture with PPTs, classroom presentations, Analysis	8
Unit 4	**Logic:** Logical connectives, Truth tables, Tautologies and Contradiction, Logical equivalence, Algebra of propositions	Audio/Video clips, group discussion, lecture with PPTs, Quiz	8

Unit 5	**Graph Theory:** Introduction and Basic Terminology of Graphs, Planer Graphs, Multigraphs and weighted graphs, Isomorphic Graphs, Walk, Paths, Cycles and Connected Graph, Complete Graph, Shortest Path in Weighted Graph, Matrix Representation of Graph, Eulerian Paths and Circuits, Tree, Spanning Tree, minimal Spanning Tree **Application of AI in discrete structures** **Graph Theory** Pathfinding and Optimization **Set Theory** Knowledge Representation	Audio/Video clips, group discussion, lecture with PPTs, Quiz	8

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	C.L.Liu, Elements of Discrete Mathematics, Tata McGraw Hill Lipschutz, Discrete Mathematics, Schaum Series, Tata McGraw Hill
Articles	
References Books	Trembley,J.P. & R. Manohar Discrete Mathematical Structures with Applications inComputerScience McGrawHill Kenneth H. Rosen Discrete Mathematics and its Applications McGrawHill Deo, Narsingh Graph Theory with Application to Engineering and Computer Science Prentice Hall Of India Krishnamurthy V. Laboratory Techniques in CombinatoricsTheory &Application East-West Press Pvt. Ltd
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Java Programing
Course Code	BSPH0502[T]

Part A

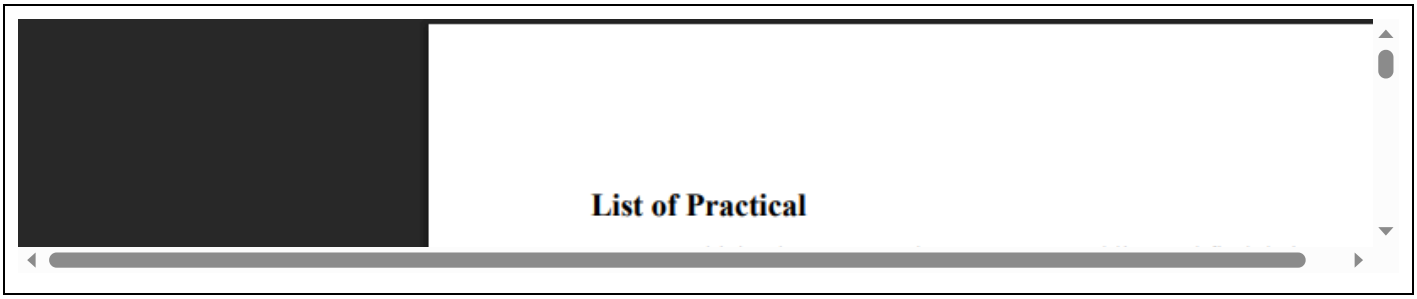
Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	basic knowledge of any one programming language such as C/C++			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember various syntax rules of java programming **(BL1-Remember)** **CO2-** To understand various Object-Oriented Concepts, Exception handling, Multithreading, networking and database connectivity techniques**(BL2-Understand)** **CO3-** To implement java AWT and Swing and for GUI Programming and Event handling, java IO for Input and output handling, jdbc for database connectivity**(BL3-Apply)** **CO4-** To analyze various Error ,and Database Handling techniques to learn how to improve the performance of the java application**(BL4-Analyze)** **CO5-** To evaluate and compare various application Development techniques**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction of java Introduction to JAVA History of Java: Comparison of Java and C++; Java as an object oriented language: Java buzzwords; JVM and JRE;A simple program, its compilation and execution; the concept of path and class path: Java Basics: Data types; Operators- precedence and associatively; Type conversion; decision making controls – if, if ..else, switch; loops – for, while, do…while; advanced for loop. Special statements–return, break, continue, Modular programming: methods and method overloading, memory allocation and garbage collection, static keyword	Lectures with whiteboard/PPT, Recorded video/interactive videos	15
2	Object Oriented Programming in Java: Class fundamentals, java Packages, Access specifies, Constructors; Copy constructor; this pointer; finalize () method, array and String, mutable and immutable; String Buffer and String Builder; Java Inheritance: Inheritance basics, method overriding and final keyword, polymorphism, static and dynamic polymorphism Abstract Class & Interfaces: abstract classes, uses of abstract classes, implementation of abstract class, defining an interface, implementing & applying interfaces, extending interfaces	Lectures with whiteboard/PPT, Recorded video/interactive videos	10
3	Exception Handling; understanding Exception and its classes; class hierarchy for Throwable, call stack mechanism, checked and unchecked Exception. Try, catch and finally block, throw and throws claus Multithreading: Basic idea of a Thread, differences between process and Thread, multithreaded programming; different states of a Active thread, The lifecycle of a thread; Creating thread with the thread class and runnable interface, thread constructor and thread methods; Thread synchronization; Thread scheduling; Producer consumer relationship; Daemon thread, Selfish threads, interthread communication.	Lectures with whiteboard/PPT, Recorded video/interactive videos	9
4	Java AWT: The class hierarchy of window fundamentals; The basic user interface components Label, Button, Check Box, Radio Button, menu and Choice menu, Text area, Frame; Layout managers Java Applets: Introduction of java Applet, Life cycle of applet; HTML Tags for applet. Java Event Handling Model: Java’s event delegation model event source, Event listeners: ActionListener, MouseListener, KeyListener	Lectures with whiteboard/PPT, Recorded video/interactive videos	7

5	Collection Framework: Introduction to collections framework, collection interfaces, collection classes JAVA Database Connectivity (JDBC): JDBC Drivers, Connection Interface, Result set types of Result Set, applying insert, delete, display and update operation	Lectures with whiteboard/PPT, Recorded video/interactive videos	4

Part C



Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	Naughton & Schildt The Complete Reference Java 2 Tata McGraw Hill
Articles	
References Books	Horstmann & Cornell “Core Java 2” (Vol I & II) Sun Microsystems
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	3	2	-	-	-	-	-	-	-	-	-	1
CO2	2	2	1	1	2	-	-	-	-	-	-	-	3	-	3
CO3	1	1	1	-	1	-	-	-	-	-	-	-	3	2	3
CO4	-	2	-	2	1	-	-	-	-	-	-	-	3	3	3
CO5	-	1	-	-	1	-	-	-	-	-	-	-	2	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	AI and its Application
Course Code	DSE1[T]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Specific Elective							
Pre-Requisite/s	General programming concepts, understanding of software systems, Software engineering process, Logic.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Remember**(BL1-Remember)** **CO2-** Understand**(BL2-Understand)** **CO3-** Analyze**(BL3-Apply)** **CO4-** Apply**(BL4-Analyze)** **CO5-** Create**(BL6-Create)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
Unit -1	General Issues and Overview of AI The AI problems, what is an AI technique, Characteristics of AI applications. Introduction to LISP programming: Syntax and numeric functions, Basic list manipulation functions, predicates and conditionals, input output and local variables, iteration and recursion, property lists and arrays	Lecturing	12
Unit 2	Problem Solving, Search and Control Strategies: General problem solving, production systems, control strategies forward and backward chaining, exhaustive searches depth first breadth first search. Heuristic Search Techniques Hill climbing, branch and bound technique, best first search & A* algorithm, AND / OR graphs, problem reduction & AO* algorithm, constraint satisfaction problems.	Lecturing	10
Unit 3	Knowledge Representations : First order predicate calculus, skolemization, resolution principle & unification, interface mechanisms, horn's clauses, semantic networks, frame systems and value inheritance, scripts, conceptual dependency.	Lecturing	10
Unit 4	Natural Language processing Parsing techniques, context free grammar, recursive transitions nets (RNT), augmented transition nets (ATN), case and logic grammars, symantic analysis.Game playing Minimax search procedure, alpha-beta cutoffs, additional refinements. Planning: Overview an example domain the block word, component of planning systems, goal stack planning, non linear planning.	Case Study	7
Unit 5	Probabilistic Reasoning and Uncertainty Probability theory, bayes theorem and bayesian networks, certainty factor. Expert Systems: Introduction to expert system and application of expert systems, various expert system shells, vidwanframe work, knowledge acquisition, case studies, MYCIN. Learning: Rote learning, learning by induction, explanation based learning.	Case Study	6

Part C

Case Study

Rules/Instructions

- Students are required to prepare Case study on any one of the topic.
- Typed (Properly formatted , at least 20 Pages with front page and index , summary)
- Students are required to upload the signed copy of case study on LMS within time line.
- It is an individual activity

Topic : 1. Exploring the Role of Machine Learning in Financial Fraud Detection: A Case Study of Credit Card Companies

It must consists of following points-

- Overview of types of frauds in the field of digital transactions.
- Emphasis should be given on literature review with respect to role of machine leaning in fraud detection as well as prevention.
- Supporting data survey by the reputed organization/Journals can be added to case study.
- References

Topic : 2

An Analysis of the Effectiveness of Expert Systems in Improving Decision Making in the Healthcare Industry

It must consist of following points -

- Key features of expert system.
- Architecture used in expert system
- Examples of expert system.
- Comparative study of expert systems used in healthcare Industry using literature survey.
- Results in graphs illustrating effectiveness of expert system in Improving Decision Making in the Healthcare Industry
- References

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	050	60	30	40	20

Part E

Books	Elaine Rich and Kevin Knight “Artificial Intelligence”-Tata McGraw Hill. Artificial intelligence” 4 ed. Pearson.
Articles	
References Books	Dan W. Patterson “Introduction to Artificial Intelligence and Expert Systems”, Prentice India. Nils J. Nilson “Principles of Artificial Intelligence”, Narosa Publishing House. M.Sasikumar,S.Ramani etc. “Rule based Expert System”, Narosa Publishing House.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	1	2	1	2	-	-	-	1	-	-	-
CO2	-	3	3	2	3	-	-	-	1	-	-	1	-	-	-
CO3	-	3	3	2	3	2	2	1	1	-	-	1	-	-	-
CO4	-	3	2	2	3	-	-	-	2	-	-	1	-	-	-
CO5	-	1	2	1	2	1	1	1	1	-	-	1	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Statistical Mehods
Course Code	SEC0501[T]

Part A

Year	3rd	**Semester**	5th	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Skill Enhancement Courses							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** CO1: Students learn to design data collection plans and basic tools of descriptive statistics. **(BL1-Remember)** **CO2-** CO2: Students learn to identify the relationship between two variables using scatter plot and Interpret a simple correlation.**(BL2-Understand)** **CO3-** CO3: Students learn different types of continuous distribution with their properties and applications.**(BL3-Apply)** **CO4-** CO4: Understand the concept of sampling distribution of a statistic and its properties, difference between parameter and statistic**(BL4-Analyze)** **CO5-** CO5: Students are able to describe the properties of unbiasedness. They are also learning to identify the null hypothesis, alternative hypothesis and test statistic. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Frequency distribution- Measures of central tendency, Mean, Median, Mode, G.M, H.M, , Measures of dispersion-, Mean deviation, Standard deviation, Moments, Skewness and kurtosis(only concept)	Audio/Video clips, group discussion, lecture with PPTs, quiz	7
Unit 2	Probability- Event, Sample space, Probability of an event, Addition and multiplication theorems, Baye's theorem, Continuous probability- probability density function, Mathematical expectation,	Audio/Video clips, group discussion, lecture with PPTs, quiz	7
Unit 3	Theoretical distribution- Binomial, Poisson, rectangular and exponential distributions, their properties and uses	Audio/Video clips, group discussion, lecture with PPTs, classroom presentations, Analysis	8
Unit 4	Methods of least squares, Curve fitting, correlation and regression, partial and multiple correlations (upto three variables only).	Audio/Video clips, group discussion, lecture with PPTs, Quiz	7
Unit 5	Sampling- Sampling of large samples, Null and alternative hypothesis, Errors of first and second kinds, Level of significance, Critical region, Tests of significance based on chi-square, t, F and Z-statistics **Application of AI in statistical methods** **Enhancing Data Analysis** Regression Analysis **Automation of Statistical Workflows** Automation of Statistical Workflows Data Sampling **Advanced Statistical Modeling** **Bayesian Networks:** Real-Time Decision Making Statistical Process Control (SPC)	Audio/Video clips, group discussion, lecture with PPTs, Quiz	11

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	**List of Practicals on Statistical Methods** 1. **Data Collection and Tabulation** ◦ Designing a questionnaire or survey ◦ Organizing raw data into frequency tables 2. **Graphical Representation of Data** ◦ Histogram, Frequency polygon, Ogive curves ◦ Pie chart and Bar chart using Excel/R/Python 3. **Measures of Central Tendency** ◦ Calculation of Mean, Median, and Mode for grouped and ungrouped data ◦ Use of software (Excel/R) for validation 4. **Measures of Dispersion** ◦ Range, Quartile Deviation, Mean Deviation, Standard Deviation ◦ Coefficient of Variation and its interpretation 5. **Skewness and Kurtosis** ◦ Calculation and interpretation using Karl Pearson and Bowley's methods 6. **Correlation Analysis** ◦ Pearson's and Spearman's Rank Correlation Coefficients ◦ Visualization using scatter plots 7. **Regression Analysis** ◦ Simple linear regression: Fitting and interpreting equations ◦ Prediction using regression line 8. **Probability Distributions** ◦ Empirical verification of Binomial, Poisson, and Normal distributions ◦ Plotting and comparison with theoretical curves 9. **Sampling Techniques** ◦ Random, stratified, and systematic sampling ◦ Hands-on demonstration with real/virtual data 10. **Hypothesis Testing** ◦ z-test, t-test, chi-square test (one and two sample cases)	Experiments	BL4-Analyze	10

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	H. C. Saxena and J. N. Kapoor Mathematical Statistics S. Chand and Co.
Articles	
References Books	M. Ray, Statistical Methods Ram Prasad Publication
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Software Enineering
Course Code	BSCS0601[T]

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	student must have knowledge about basic data structures , computer organization & programming language concepts.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember the basics of software engineering**(BL1-Remember)** **CO2-** To understand the basics characteristic's & crisis of software and process of software engineering systems**(BL2-Understand)** **CO3-** To implement various SDLC, ER, DFD models, to collect SRS, And understand the software.**(BL3-Apply)** **CO4-** To Analyze various various testing techniques and the concept of testing strategies**(BL4-Analyze)** **CO5-** To evaluate the the need of Software Maintenance and Software Project Management Software **(BL5-Evaluate)** **CO6-** To create the various Design Strategies, Architectural Design concept for better development of software.**(BL6-Create)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Unit-1	Introduction to Software Engineering: Software, The changing nature of software, product and process, software engineering-a layered technology.	Lecturing	6
Unit-2	Process Models: Software Development Process Model, Waterfall Model, Prototyping Model, Spiral Model, Iterative Model	Case Study	6
Unit-3	Software Project Management: The Management Spectrum, Scheduling and Tracking, SW Measurement - Size, Process and Project Metrics; LOC	Lecturing	6
Unit-4	Software Design: Design Concepts-abstraction, architecture, modularity . Software Quality Assurance: Quality Concepts, Software Quality Assurance, Assurance, Software Reliability, Introduction to ISO standard.	Case Study	6
Unit-5	Software Testing and maintenance: Definition, Types of Testing: Black Box Testing, White Box Testing, Unit Testing, Integration Testing, system testing , Introduction of maintenance.	Case Study	6

Part C

Case Study
Software Engineering (402)

1. Analysing the challenges and solutions for software maintenance: Students are required to identify the challenges appeared during software maintenance using various types of information gathering tools and must propose a systematic and feasible maintenance plan with output showing growth with respect to following points
    - User Satisfaction level
    - Software periodic update
    - Software Licence renewable
    - Software upgradability.

2. Perform automated testing and design customized test cases on any project modules. Also report the bugs encountered during testing phase and compute time incurred in rectifying bugs during testing phase. Compare the time involved in rectifying bugs at development phase and at testing phase.
3. You are required to build a Inventory management system for a departmental store, Prepare a logical design as well as use case and system flowcharts for the same.

4. You are required to build a Student information system for a departmental of school of Engineering, Prepare a logical design as well as use case and system flowcharts for the same.
5.
6. Compute the following using any project/modules of your choice
    - Product Metrics
    - Process Metrics
    - Project Metrics
7. Prepare a complete SRS report of a software that is not in existence as well as software that is already is being used but needs to be updated.

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	12
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	Pressman, R. S., & Dr, B. R. M. (2014, January 23). Software Engineering: A Practitioner's Approach. McGraw-Hill Education. http://books.google.ie/books?
Articles	
References Books	Pressman, R. S., & Dr, B. R. M. (2014, January 23). Software Engineering: A Practitioner's Approach. McGraw-Hill Education. http://books.google.ie/books?
MOOC Courses	
Videos	https://onlinecourses.nptel.ac.in/noc20_cs68/preview

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	-	-	-	1	-	2
CO2	1	-	-	-	1	2	-	-	-	-	-	-	1	2	3
CO3	2	1	-	-	1	-	-	-	-	-	-	-	3	2	3
CO4	2	2	-	3	1	-	-	-	-	-	-	-	3	2	3
CO5	2	2	-	2	1	-	-	-	-	-	-	-	3	2	3
CO6	1	1	2	3	2	2	-	-	-	2	-	-	3	3	3

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Python programming
Course Code	BSCS0602[T]

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember the basic programming concept.**(BL1-Remember)** **CO2-** Understand the basics of Python like python origin downloading and installing and basic concepts of python.**(BL2-Understand)** **CO3-** Apply the various conditional and looping statement and functional programming. **(BL3-Apply)** **CO4-** Explain various objects numbers and sequence in python Analyze the concept of regular expression**(BL4-Analyze)** **CO5-** Evaluate the concept of object-oriented programming for better utilization of language**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education)				

Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Introduction to Python programming Introduction, origin of Python, Downloading, Installing and Running Python, Python Basics: Comment, Identifier, Indentations, Basic data types, conversions, operators, Build in functions. I/O Statements, Condition Statements & Loops: If, else, elif), conditional expressions, while, for, break continue	Lectures	6
Unit 2	Data Structures in Python Lists: Introduction, Accessing list, Operations, Working with lists, Tuple: Introduction, Accessing tuples, Operations, Working with list, Dictionaries: Introduction, Accessing values in dictionaries, Working with dictionaries, Set: Introduction ,Accessing set, Operations, Working with sets	Lectures	6
Unit 3	Functions, Modules, File Handling Functions: Defining a function, Calling a function, Types of functions, Function Arguments, Anonymous function, Global and local variables, Recursion. Modules: Creating modules, Importing module, Packages, File Handling :Opening and closing files, Reading and writing files	Experiments	6
Unit 4	Exceptional Handling, Regular Expressions Exception Handling: Exception, Exception Handling, Try and Except clause,User Defined Exceptions, Exception handling in files). Regular Expressions: Introduction/motivation, special symbols and characters for REs , Match function, Search function., Matching VS Searching., Modifiers, Patterns.	Experiments	6
Unit -5	Object Oriented Programming in Python Introduction, OOPS Basics: Class and object Constructors, Need of Encapsulations, Attributes, default attributes, static attributes, static methods, initializing objects, Pass by reference, self. Relational-ships: Introduction, Aggregation, Dependency. Inheritance: Need of Inheritance, Overriding, Super, Types of Inheritance. Abstract Class, methods.	PBL	6

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
unit 1-5	PBL	PBL		4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	Gondaliya, V. (2019, August 30). Programming With Python. Vaibhav Gondaliya.
Articles	
References Books	Hetland, M. L. (2006, November 7). Beginning Python. Apress
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	2	2	-	-	-	-	1	-	1	-	1
CO2	1	1	-	2	2	2	-	-	-	2	-	-	1	2	3
CO3	-	2	-	-	-	-	-	-	-	-	-	-	3	2	3
CO4	-	2	-	2	1	-	-	-	-	-	-	-	3	2	3
CO5	-	2	-	2	1	-	-	-	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Cloud Computing
Course Code	DSE0601[T]

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Discipline Specific Elective							
Pre-Requisite/s	To understand the contents and successfully complete this course, a participant must have a basic understanding of Storage Systems, Operating systems, Networking and Database.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember the various technologies for information storage and management. **(BL1-Remember)** **CO2-** To understand the storage techniques, concepts of data center, data center infrastructure management and services. **(BL2-Understand)** **CO3-** To implement the setup of storage techniques such as RAID, LUN Masking at data center. Create the virtual server and virtualize the resources as on demand.**(BL3-Apply)** **CO4-** To analyze the functionality of data center or storage infrastructure as per policies. **(BL4-Analyze)** **CO5-** To evaluate the performance of data center or storage infrastructure on various performance parameters. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG10(Reduced inequalities)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction to Storage Technology: Data proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information Lifecycle Management, Data categorization	Lecture with PPT, Audio/Video clips, Pictures, Quiz, Present Report	12
2	Storage Systems Architecture: Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels, hot sparing	Lecture with PPT, Audio/Video clips, Pictures, Quiz, implementation on cloud tools	12
3	Introduction to Networked Storage: JBOD, DAS, NAS, SAN & CAS evolution and comparison. Applications, Elements, connectivity, standards, management.	Lecture with PPT, Audio/Video clips, Pictures, Quiz, Examples of real-life applications such as YouTube, Facebook, Instagram, WhatsApp, LinkedIn etc.,	12
4	Hybrid Storage solutions; Virtualization: Memory, network, server, storage & appliances. Data center concepts & requirements, Backup & Disaster Recovery: Principles	Lecture with PPT, Audio/Video clips, Pictures, Quiz, Demonstration of third-party cloud environment	12
5	Information storage on cloud: Concept of Cloud, Cloud Computing, storage on Cloud, Cloud Vocabulary, Architectural Framework, Cloud benefits, Cloud Computing Evolution, Applications & services on cloud, Cloud service providers and Models, Essential characteristics of cloud computing, Cloud Security and integration.	Lecture with PPT, Audio/Video clips, Pictures	12

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	G. Somasundaram, Alok Shrivastava (EMC Education Services) Editors; Information Storage and Management: Storing, Managing, and Protecting Digital Information; Wiley India. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi; Mastering Cloud Computing, Elsevier Ulf Troppens; Storage Network Explained: Basic and Application of SAN, NAS; Wiley India.
Articles	
References Books	Nick Antonopoulos, Lee Gillam; Cloud Computing: Principles, System & Application, Springer. John W. Rittinghouse, James F. Ransome; Cloud Computing: Implementation, Management and Security, CRC Press - Taylor Francis Publication.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	1	2	1
CO2	1	1	-	-	1	-	3	-	-	-	-	2	2	2	1
CO3	1	2	2	2	2	-	3	-	-	-	-	2	3	3	2
CO4	1	3	2	2	2	-	2	-	-	-	-	2	3	2	2
CO5	-	3	2	2	2	-	2	-	2	-	-	2	3	3	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Ethical Hacking Fundamental
Course Code	DSE0602[T]

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Specific Elective							
Pre-Requisite/s	: An attendee of this course must have knowledge of Computer system and its components and should understand the types of data and data storage in computer system. Must be familiar with Linux Operating system, communication network and must have knowledge of Python or any other scripting language.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** An attendee will be able to remember the basics of computer networks, Network security, Threats in a network, social networks, attack domains and will be able to remember the defense mechanisms against all attacks. **(BL1-Remember)** **CO2-** An attendee will understand the risks of being on network and possible attacks that can be done on a machine over internet gaining access on devices over network, social networks IOT Devices and methods to secure them.**(BL2-Understand)** **CO3-** An attendee will be able to Apply the concepts learnt to identify the hardware and software vulnerabilities in sandbox environment, deploy an attack and will be able to develop countermeasures against attack vectors identified.**(BL3-Apply)** **CO4-** An attendee will be able to analyze the methods used to deploy an attack and design preventive measures for network devices against various attacks and learn about their functionalities.**(BL4-Analyze)** **CO5-** An attendee will be able to evaluate the methods used to exploit the attack vectors open for attacks over the network and record their performance in all possible domains. **(BL5-Evaluate)** **CO6-** An attendee will be able to Create / design systems/algorithms for identifying attacks, reporting them and preventing them over the communication network.**(BL6-Create)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies)				

Part B

Modules	Contents	Pedagogy	Hours
1	Information Security Fundamentals, Cyber Kill Chain Methodology, Hacking Concepts and Hacker Classes, Different Phases of Hacking Cycle, Ethical Hacking Concepts, Scope, and Limitations, Ethical Hacking Tools, Threat and Threat Sources, Malware and its Types, Vulnerabilities, Vulnerability Assessment.	Whiteboard, PPT, Programming Labs	8
2	Password Cracking Techniques and Countermeasures, Password Cracking Techniques, Password Cracking Tools, Password Cracking Countermeasures, Social Engineering Concepts and its Phases, Social Engineering Techniques, Insider Threats and Identity Theft, Social Engineering Countermeasures.	Whiteboard, PPT, Programming Labs	8
3	Sniffing, Packet Sniffing Concepts, Sniffing Techniques, Sniffing Countermeasures, Denial-of-Service, DoS and DDoS Attacks, DoS and DDoS Attack Countermeasures, Session Hijacking, Session Hijacking Attacks, Session Hijacking Attack Countermeasures, Web Server Attacks, Web Server Attacks, Web Server Attack Countermeasures, Web Application Attacks, Web Application Architecture and Vulnerability Stack, Web Application Threats and Attacks, Web Application Attack Countermeasures, SQL Injection Attacks, SQL Injection Attacks, SQL Injection Attack Countermeasures.	Whiteboard, PPT, Programming Labs	8
4	Wireless Terminology, Wireless Encryption, Wireless Network-Specific Attack Techniques, Bluetooth Attacks, Wireless Attack Countermeasures, Mobile Attack Anatomy, Mobile Platform Attack Vectors and Vulnerabilities, Mobile Device Management (MDM) Concept, Mobile Attack Countermeasures.	Whiteboard, PPT, Programming Labs	8
5	IoT Attacks, IoT Concepts, IoT Threats and Attacks, IoT Attack Countermeasures, OT Attacks, OT Concepts, OT Threats and Attacks, OT Attack Countermeasures. Cloud Computing Concepts, Container Technology, Cloud Computing Threats, Cloud Attack Countermeasures. Fundamentals of Penetration Testing and its Benefits, Strategies and Phases of Penetration Testing, Guidelines and Recommendations for Penetration Testing.	Whiteboard, PPT, Programming Labs	8

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1-2	Assignment	Experiments	BL2-Understand	8
3-4	Activity	Experiments	BL3-Apply	10
1-5	Project	Case Study	BL4-Analyze	15

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	Matt Walker CEH Certified Ethical Hacker All-in-One Exam Guide, Second Edition 2nd Edition
Articles	Patrick Engebretson The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy (Syngress Basics Series) 1st Edition Syngress Basics Series
References Books	Hein Smith (Author), Hilary Morrison (Author) Ethical Hacking: A Comprehensive Beginners Guide to Learn and Master Ethical Hacking
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	-	-	-	-	-	-	-	-	-	3	2	1
CO2	1	1	1	2	1	-	-	-	-	-	-	-	2	3	1
CO3	2	1	1	2	2	-	-	-	-	-	-	-	3	2	1
CO4	1	1	1	2	3	-	-	-	-	-	-	-	1	3	1
CO5	2	2	2	-	-	-	-	-	-	-	-	-	3	2	1
CO6	-	2	1	-	-	-	-	-	-	-	-	-	1	2	1

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Mobile Application Development
Course Code	DSE0603[T]

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Discipline Specific Elective							
Pre-Requisite/s	Prerequisites - Having the little overview about the object-oriented programming.			**Co-Requisite/s**	Prerequisites - Having the little overview about the object-oriented programming.			
Course Outcomes & Bloom's Level	**CO1-** To remember various syntax rules of the programming language such as java and XML**(BL1-Remember)** **CO2-** CO2: To understand Object Oriented concepts for Android and various mobile application development concepts including interface designing, handling multiple activities. **(BL2-Understand)** **CO3-** To implement XML, Java and mysql for database connectivity and file system.**(BL3-Apply)** **CO4-** To analyze various widgets and learn to use them as per the problem.**(BL4-Analyze)** **CO5-** To develop solutions for real world problems using android application development. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG10(Reduced inequalities) SDG11(Sustainable cities and economies)				

Part B

Modules	Contents	Pedagogy	Hours
1	Getting Started with Android - Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file	Lecturing	9
2	Android Application Design Essentials - Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions. Activity States and Life Cycle. XML : Tage, Namespaces.	Lecturing	9
3	Building Blocks of Mobile Apps - Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.	PBL	9
4	SQLite (DBMS) Shared Preferences, Mobile Databases such as SQLite, Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.	Case Study	9
5	Using Common Android APIs: Using Android Data and Storage APIs, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.	Lecturing	9

Part C

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	22
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	20

Part E

Books	Android Wireless Application Development
Articles	
References Books	Charlie Collins, Michael D.Galpin, Matthias Kappler Android in Practice DreamTech Press 2016
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	1	1	2
CO2	1	-	-	-	2	-	-	-	-	-	-	-	3	2	2
CO3	2	-	-	-	1	-	2	-	-	-	-	-	3	2	2
CO4	-	-	-	2	2	2	-	2	-	-	1	1	2	2	2
CO5	-	-	1	-	-	2	-	1	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Meditation and yoga
Course Code	SEC0601[T]

Part A

Year	3rd	**Semester**	6th	**Credits**	L	T	P	C
					3	1	0	4
Course Type	Theory only							
Course Category	Discipline Core							
Pre-Requisite/s	Knowledge of basic Fitness			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** CO-1 Recall about Aims, Objectives, principles and other concepts of Health Education**(BL1-Remember)** **CO2-** CO-2 Explain about the foundation of yoga and the Asanas**(BL2-Understand)** **CO3-** CO-3 Demonstrate various asanas of Yoga**(BL3-Apply)** **CO4-** CO-4 Categorize asanas according to their difficulty level.**(BL4-Analyze)** **CO5-** CO-5 Compare the effect of various asanas through research.**(BL5-Evaluate)** **CO6-** CO-6 Formulate an efficient lifestyle with the help of research in yoga.**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✓ Environment ✕		**SDG (Goals)**	SDG3(Good health and well-being) SDG8(Decent work and economic growth) SDG16(Peace Justice and strong institutions) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours
1	ject of that semester given by the subject teacher C. COURSE CONTENTS UNIT CONTENTS PEDAGOGY Unit 1 Introduction o Meaning and Definition of Yoga o Aims and Objectives of Yoga o Yoga in Early Upanisads o The Yoga Sutra: General Consideration o Need and Importance of Yoga in Physical Education and Sports	Background of concepts, quiz	15
2	o The Astanga Yoga: Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi o Yoga in the Bhagavadgita - Karma Yoga, Raja Yoga, Jnana Yoga and Bhakti Yoga	Background of concepts, quiz	15
3	Effect of Asanas and Pranayama on various system of the body Classification of asanas with special reference to physical education and sports o Influences of relaxtive, meditative posture on various system of the body o Types of Bandh Type of kriyas	Background of concepts, quiz	15
4	Basic, applied and action research in Yoga o Difference between yogic practices and physical exercises o Yoga education centers in India and abroad o Competitions in Yogasanas	Background of concepts, quiz	15

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	32	70	23	30	9
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
0	0	0	0	0	0

Part E

Books	Shekar,K. C. Yoga for health. 2003 Delhi: Khel Sahitya Kendra.
Articles	
References Books	Brown, F. Y. How to use yoga 2000Delhi:Sports Publication. Shankar,G. Holistic approach ofyoga. 1998 New Delhi : Aditya Publishers. Rajjan, S. M. Yoga strenthening ofrelexation for sports man 1985 New Delhi:Allied Publishers. Gharote, M. L. &Ganguly, H. Teaching methods for yogic practices 1988 Lonawala: Kaixydahmoe. Gharote, M. L. &Ganguly, H. Teaching methods for yogic practices 1988 Lonawala: Kaixydahmoe. Rajjan, S. M. Yoga strenthening ofrelexation for sports man 1985 New Delhi:Allied Publishers. Shankar,G. Holistic approach ofyoga.1998 NewDelhi:Aditya Publishers.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	-	2	3	-	3	-	-	-	-	-	-	-	-	-
CO2	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	-	3	-	-	-	-	-	-	-	-	-	-
CO5	-	1	-	3	-	-	-	-	-	-	-	-	-	-	-
CO6	-	1	1	3	-	-	-	-	-	3	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Network Security
Course Code	BSCS0701

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	• Basic knowledge of computer Network • You need to have a decent understanding of the basics of TCP/IP. • You should know the difference between IP, ICMP, TCP, and UDP. • You should know what port numbers and sequence numbers are, and have (some) understanding of the TCP flags.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** • Undertake routine tasks to secure a network. **(BL1-Remember)** **CO2-** • Understand the factors that place an internet-based information system at risk and apply this knowledge to simple case studies. **(BL2-Understand)** **CO3-** • Evaluate procedures to secure a system against failure, theft, invasion and sabotage. **(BL3-Apply)** **CO4-** • Understand and apply the concepts for administrating a small company's network. **(BL4-Analyze)** **CO5-** Design the security framework using multiple Cryptography techniques**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction: Computer Security Concepts, Attacks, Services and Mechanisms, Security Attacks, types of attacks- Layer and cryptography-Authorization-Key, Security Services, Integrity check, Cipher Model, Substitution Techniques, Transposition Techniques, Viruses.	Lecturing	12
2	Introduction to Cryptography: Fundamentals Principles of Cryptography, Quantum cryptography, Introduction- Secret Key cryptography, Public Key Cryptography, Security Services. Conventional Encryption: Classical Techniques, Conventional Encryption Model, Stegenography, Classical Encryption Techniques. Modern Techniques: Data Encyption Standard (DES), Triple DES, Block Cipher Principles, DES Standard, DES Strength, Block Cipher Modes of Operation.	Lecturing	10
3	Public key Cryptography And Authentication: Public Key Encryption: Public-Key Cryptography: Principles Of Public-Key Cryptosystems, RSA Algorithm, Key Management, Public-Key Infrastructure(PKI), Fermat's & Euler's Theorem, Diffie-Hellman, Authentication: Password based Authentication, Address based Authentication, Cryptographic Authentication Protocols, Passwords as Cryptographic Keys, Trusted Intermediaries, Multiple Trusted Intermediaries and Session Key Establishment.	Lecturing	9
4	Hash function and Digital Signature Message authentication and Hash function: Hash function, Requirements, Security, Hash algorithm: MD5 message digest algorithm, Digital signature, Digital Signature Standard., X.509 certificates.	Lecturing	8
5	Web and System Security Web- Security, Threats, Secure Sockets Layers (SSL), Electronic mail security: Pretty Good privacy, S/MIME, IP Security Overview, IP Security Architecture: Authentication Header, ESP, Firewalls, System Security, Viruses, Malicious Program, Nature of Viruses, Types Of Viruses, mutual	Lecturing BPL	6

Part C

List of Experiments

S *NO.*	**Index**
1	Study of different wireless network components and features of any one of the Mobile Security Apps.
2	Study of the features of firewall in providing network security and to set Firewall Security in windows.
3	Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome).
4	Study of different types of vulnerabilities for hacking a websites / Web Applications.
5	Analysis the Security Vulnerabilities of E-commerce services.
6	Analysis the security vulnerabilities of E-Mail Application.

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	

Part E

Books	William Stallings, (2013), "Cryptography and Network Security: Principles and Practice", Prentice Hall, New Jersey.
Articles	
References Books	. AtulKahate, (2011)' "Cryptography and Network Security", TMH1. Johannes A. Buchmann (2007), "Introduction to cryptography", Springer- Verlag.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	2	2
CO2	1	-	-	3	2	2	-	2	-	-	-	-	2	3	2
CO3	1	2	-	3	2	2	3	2	-	1	-	-	3	3	2
CO4	-	2	-	2	1	-	-	-	-	-	-	-	1	-	3
CO5	-	2	1	-	-	-	-	-	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Data Communucation and Network
Course Code	BSCS0702

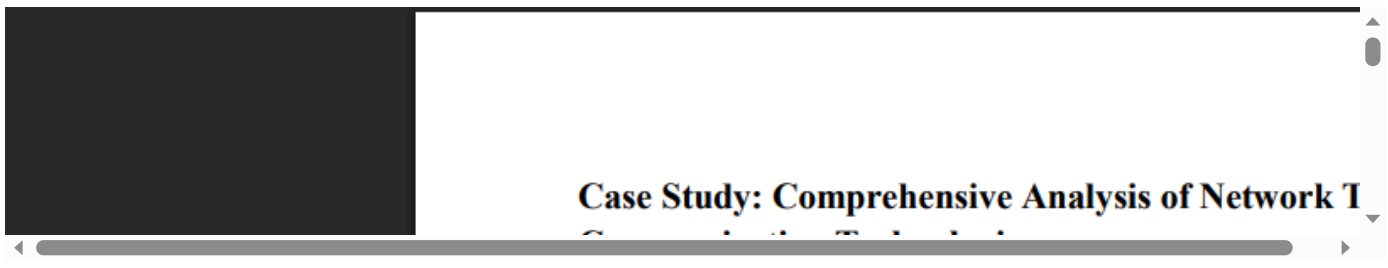
Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Disciplinary Major							
Pre-Requisite/s	Basic Networking Concepts: Familiarize yourself with concepts like IP addresses, subnetting, routing, and switching. Understanding the OSI (Open Systems Interconnection) model and the TCP/IP protocol suite is fundamental.			**Co-Requisite/s**	Basic Networking Concepts: Familiarize yourself with concepts like IP addresses, subnetting, routing, and switching. Understanding the OSI (Open Systems Interconnection) model and the TCP/IP protocol suite is fundamental.			
Course Outcomes & Bloom's Level	**CO1-** Remembering the concepts of computer networks, their types.**(BL1-Remember)** **CO2-** Understand to the concept of Classfull and Classless addressing Network address Translation, Mobile IP.**(BL2-Understand)** **CO3-** Apply to Unicast and Multicast Routing and Next Generation IP for networking.**(BL3-Apply)** **CO4-** e the applications to address the issues of Networking Technologies.**(BL4-Analyze)** **CO5-** Evaluating to investigate routers, IP and Routing Algorithms in Network Layer**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
1	Data Communication System: Purpose, Components: Source, transmitter, transmission System, receiver, and destination. Line Configurations, Signal Representation, Parallel and Serial Data Transmission, Asynchronous and Synchronous Modes of Data Transmission. Digital Signal Encoding, Channel Coding	LECTURING	12
2	Analog and digital data transmission. Data and signal. Analog and digital Signaling of analog and digital data. Modem, Modulation techniques, CODEC, Digital Transmitter etc. Introduction to Network, OSI reference model, TCP/IP reference model. Transmission Media: Magnetic Media, Twisted-Pair cables, Baseband & Broadband Coaxial cables, Fiber Optics. Wireless Transmission: Radio Transmission, Microwave Transmission	PBL	12
3	ISDN; ATM; Data Link Layer: Services, Framing, Error Control, Error- detecting & Correcting Codes. Data Link Protocols: Stop-and-Wait Protocol, Sliding Window Protocol. HDLC; Static & Dynamic Channel allocation in LANs & MANs. Multiple Access Protocols: ALOHA, CSMA/CD	CASE STUDY	13
4	IEEE standards 102.3 and Ethernet, 102.4: Token Bus; 102.5: Token Ring. Bridges, Routers, Gateways, Routing Algorithm, Congestion control Algorithm, Internetworking, The TCP/IP Protocol ,IP Addressing, Subnets.	LECTURING	13
5	Wide Area Network: Introduction, Network routing, Routing Tables, Types of routing, Dijkstra's Algorithm, Bellman-Ford Algorithm, Link state routing, Open shortest path first, Flooding, Broadcasting, Multicasting,Internet Protocols, Overview of TCP/IP, Transport protocols, Elements of Transport Protocol, Transmission control protocol (TCP), User data- gram protocol (UDP).	LECTURING	10

Part C



Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Behrouz A. Data Communications and Networking. Andrew S. Tanenbaum Computer Networks; Pearson Prentice Hall
Articles	
References Books	William J. Beyda Data Communication Prentice Hall William Stallings Data and Computer Communications Pearson Prentice Hall
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	1	1	2
CO2	1	-	-	-	2	-	-	-	-	-	-	-	3	2	2
CO3	2	-	-	-	1	-	-	2	-	-	-	-	3	2	2
CO4	-	-	-	2	2	2	-	2	-	-	1	1	2	2	2
CO5	-	-	-	1	-	-	2	-	1	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Cyber laws
Course Code	DSE701

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Disciplinary Minor							
Pre-Requisite/s	General understanding of cyber space , computer network.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand the structure of cyber space and network, Information Technology and law in general. **(BL2-Understand)** **CO2-** Apply IT act on Pseudo case studies.**(BL3-Apply)** **CO3-** Analyze the type of a digital crime with reference to the provisions in IT Act 200 and 2008.**(BL4-Analyze)** **CO4-** Understand IT Act 2000 of India along with some other countries.**(BL1-Remember)** **CO5-** Evaluate the impact of a digital crime on the victim and the provision punishment to the accused.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
1	Cyber Technology: Understanding the Cyber Technology, Technology and Law, Constraint and Scope of Cyber Laws Evolution of the IT Act 2000, Genesis and Necessity	Lectures with whiteboard/PPT, Recorded video/interactive videos, case study	4
2	Penalties &Offences under IT Act Amendments under IT Act and Impact on other related Acts (Amendments): (a) Amendments to Indian Penal Code. (b) Amendments to Indian Evidence Act. (c) Amendments to Bankers Book Evidence Act. (d) Amendments to Reserve Bank of India Act.	Lectures with whiteboard/PPT, Recorded video/interactive videos, case study	4
3	Cyber Appellate Tribunal with Special Reference to the Cyber Regulation Appellate Tribunal (Procedures) Rules 2000, The Information Technology (Procedures and Safeguards for Interception, Monitoring and Decryption of Information) Rules, 2009 and Corresponding International Legislation in US, UK and Europe, The Information Technology (Procedures and Safeguards for Blocking the access of Information by Public) Rules, 2009 and Corresponding International Legislation in US, UK and Europe, The Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules, 2009 and Corresponding International Legislation in US, UK and Europe	Lectures with whiteboard/PPT, Recorded video/interactive videos, practical problems	4
4	Cyber and Cyber Space with reference to Democracy and Sovereignty, Developments in Cyber law Jurisprudence, Role of law in Cyber World: Regulation of Cyber Space in India Cyber Space Jurisdiction (a) Jurisdiction issues under IT Act, 2000. (b) Traditional principals of Jurisdiction (c) Extra- terrestrial Jurisdiction (d) Case Laws on Cyber Space Jurisdiction (e) Taxation issues in Cyberspace	Lectures with whiteboard/PPT, Recorded video/interactive videos	4
5	Cyber Space Jurisdiction (a) Jurisdiction issues under IT Act, 2000. (b) Traditional principals of Jurisdiction (c) Extra- terrestrial Jurisdiction (d) Case Laws on Cyber Space Jurisdiction (e) Taxation issues in Cyberspace	Lectures with whiteboard/PPT, Recorded video/interactive videos, Practical Labs	4

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1-2	Assignment	Case Study	BL2-Understand	2
3-4	Quiz	PBL	BL3-Apply	1
5	Case Based Activity	Field work	BL4-Analyze	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Sharma, V. (2011, January 1). Information Technology Law and Practice. Universal Law Publishing.
Articles	
References Books	Duggal, P. (2014, January 1). Legal Framework on Electronic Commerce and Intellectual Property Rights in Cyberspace
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	1	1	2
CO2	1	-	-	-	2	-	-	-	-	-	-	-	3	2	2
CO3	2	-	-	-	1	-	2	-	-	-	-	-	3	2	2
CO4	-	-	-	2	2	2	-	2	-	-	1	1	2	2	2
CO5	-	-	1	-	2	-	1	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	DSE0702
Course Code	Image processing

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Generic Elective							
Pre-Requisite/s	Prerequisite: student must be familiar with the following: ❖ Undergraduate level mathematics. ❖ Programming in MatLab.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember various concept of digital image processing.**(BL1-Remember)** **CO2-** To understand the fundamental concepts of a digital image processing system.**(BL2-Understand)** **CO3-** Apply the concepts learnt in to design and implement with Matlab algorithms for digital image processing operations such as histogram equalization, enhancement, restoration and filtering.**(BL3-Apply)** **CO4-** Analyze the concept of designing after applying these techniques in various applications.**(BL4-Analyze)** **CO5-** Evaluate the theoretical knowledge and practical skills on digital image processing. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies)				

Part B

Modules	Contents	Pedagogy	Hours
1	Digital Image Introduction: Steps in Digital Image Processing and the Need for Digital Image Processing, Application and Components of Image Processing System. Visual Preliminaries: Brightness Adaptation and Contrast, Neighborhood of pixel, D4, D8 and Dm distances, Adjacency, path and connectivity.	Lecturing	15
2	Image Processing Image Enhancement: Contrast Stretching, Smoothing, Image Averaging, Mean Filter, Ordered Statistic Filter: Median Filter, Low Pass Filtering. Image Sharpening, High, Pass Filtering, Homomorphic Filtering.	Lecture and experiments	10
3	Image Transformation Basic Intensity Transformation Functions, Histogram, Histogram Equalization, Histogram Matching, Spatial Correlation and Convolution Error Criterion: Lossy Compression methods, loss –less compression, Huffman coding, Run length coding- Block coding, Quad Tree coding-contour coding.	Lecture and experiments	15
4	Color Processing and Image Segmentation: Color Fundamentals, RGB, CMY and HSI Color Models, Image Segmentation: Edge Models, Edge Detection, Global and Variable Thresholding, Single and Multiple Thresholds, Region Based Segmentation.	Lecture and experiments	10
5	Morphology, Representation and Description: Mathematical Morphology, Erosion and Dilation, Opening and Closing, Boundary Extraction algorithm. Border Following Algorithm, Chain Codes, Minimum Perimeter Polygons, Boundary Descriptors, Regional Descriptors.	Lecture and experiments	15

Part C

PBL Submission Guideline

Sr. No.	Submission to be done	Submission Required	Marks Allotment
1	Select Project Topic and team submission	Small presentation	2
2	Introduction & Objective of Project	PBL file	3
4	Background Study and the existing gap in particular area	PBL file	5
5	System Design (Flowcharts/Block Diagrams/ Algorithms/DFD/ER diagrams), Implementation of code, and submission of running model.	PBL File & Implementation	10
7	Final Project file submission (Strictly as per	Presentation & Viva Voce	10

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	

Part E

Books	Gonzalez, R. C., & Woods, R. E. (2008). Digital Image Processing (3rd ed.). Pearson Education Inc.
Articles	
References Books	Jain, A. K. (1989). Fundamentals of Digital Image Processing. Prentice Hall. Gonzalez, R. C., Woods, R. E., & Eddins, S. L. (2020). Digital Image Processing using Matlab. McGraw Hill Education.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	1	2	-	-	-	2	-	-	2	2	1
CO2	1	-	-	-	1	2	-	-	-	-	-	-	2	2	3
CO3	2	2	-	2	-	-	-	-	-	-	-	-	1	-	2
CO4	1	2	-	1	-	-	-	-	-	-	-	-	1	2	2
CO5	1	2	-	1	-	-	-	-	-	-	-	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Network Security
Course Code	BSCS0701

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Disciplinary Major							
Pre-Requisite/s	• Basic knowledge of computer Network • You need to have a decent understanding of the basics of TCP/IP. • You should know the difference between IP, ICMP, TCP, and UDP. • You should know what port numbers and sequence numbers are, and have (some) understanding of the TCP flags.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** • Undertake routine tasks to secure a network. **(BL1-Remember)** **CO2-** • Understand the factors that place an internet-based information system at risk and apply this knowledge to simple case studies. **(BL2-Understand)** **CO3-** • Evaluate procedures to secure a system against failure, theft, invasion and sabotage. **(BL3-Apply)** **CO4-** • Understand and apply the concepts for administrating a small company's network. **(BL4-Analyze)** **CO5-** Design the security framework using multiple Cryptography techniques**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
1	Introduction: Computer Security Concepts, Attacks, Services and Mechanisms, Security Attacks, types of attacks- Layer and cryptography-Authorization-Key, Security Services, Integrity check, Cipher Model, Substitution Techniques, Transposition Techniques, Viruses.	Lecturing	12
2	Introduction to Cryptography: Fundamentals Principles of Cryptography, Quantum cryptography, Introduction- Secret Key cryptography, Public Key Cryptography, Security Services. Conventional Encryption: Classical Techniques, Conventional Encryption Model, Stegenography, Classical Encryption Techniques. Modern Techniques: Data Encyption Standard (DES), Triple DES, Block Cipher Principles, DES Standard, DES Strength, Block Cipher Modes of Operation.	Lecturing	10
3	Public key Cryptography And Authentication: Public Key Encryption: Public-Key Cryptography: Principles Of Public-Key Cryptosystems, RSA Algorithm, Key Management, Public-Key Infrastructure(PKI), Fermat's & Euler's Theorem, Diffie-Hellman, Authentication: Password based Authentication, Address based Authentication, Cryptographic Authentication Protocols, Passwords as Cryptographic Keys, Trusted Intermediaries, Multiple Trusted Intermediaries and Session Key Establishment.	Lecturing	9
4	Hash function and Digital Signature Message authentication and Hash function: Hash function, Requirements, Security, Hash algorithm: MD5 message digest algorithm, Digital signature, Digital Signature Standard., X.509 certificates.	Lecturing	8
5	Web and System Security Web- Security, Threats, Secure Sockets Layers (SSL), Electronic mail security: Pretty Good privacy, S/MIME, IP Security Overview, IP Security Architecture: Authentication Header, ESP, Firewalls, System Security, Viruses, Malicious Program, Nature of Viruses, Types Of Viruses, mutual	Lecturing BPL	6

Part C

List of Experiments

S *NO.*	**Index**
1	Study of different wireless network components and features of any one of the Mobile Security Apps.
2	Study of the features of firewall in providing network security and to set Firewall Security in windows.
3	Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome).
4	Study of different types of vulnerabilities for hacking a websites / Web Applications.
5	Analysis the Security Vulnerabilities of E-commerce services.
6	Analysis the security vulnerabilities of E-Mail Application.

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	

Part E

Books	William Stallings, (2013), "Cryptography and Network Security: Principles and Practice", Prentice Hall, New Jersey.
Articles	
References Books	. AtulKahate, (2011)' "Cryptography and Network Security", TMH1. Johannes A. Buchmann (2007), "Introduction to cryptography", Springer- Verlag.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	2	2
CO2	1	-	-	3	2	2	-	2	-	-	-	-	2	3	2
CO3	1	2	-	3	2	2	3	2	-	1	-	-	3	3	2
CO4	-	2	-	2	1	-	-	-	-	-	-	-	1	-	3
CO5	-	2	1	-	-	-	-	-	-	-	-	-	3	2	3
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Data Communucation and Network
Course Code	BSCS0702

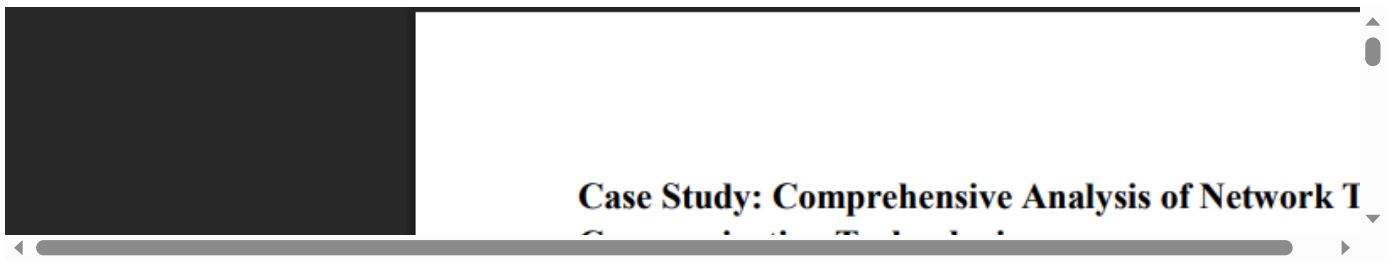
Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Disciplinary Major							
Pre-Requisite/s	Basic Networking Concepts: Familiarize yourself with concepts like IP addresses, subnetting, routing, and switching. Understanding the OSI (Open Systems Interconnection) model and the TCP/IP protocol suite is fundamental.			**Co-Requisite/s**	Basic Networking Concepts: Familiarize yourself with concepts like IP addresses, subnetting, routing, and switching. Understanding the OSI (Open Systems Interconnection) model and the TCP/IP protocol suite is fundamental.			
Course Outcomes & Bloom's Level	**CO1-** Remembering the concepts of computer networks, their types.**(BL1-Remember)** **CO2-** Understand to the concept of Classfull and Classless addressing Network address Translation, Mobile IP.**(BL2-Understand)** **CO3-** Apply to Unicast and Multicast Routing and Next Generation IP for networking.**(BL3-Apply)** **CO4-** e the applications to address the issues of Networking Technologies.**(BL4-Analyze)** **CO5-** Evaluating to investigate routers, IP and Routing Algorithms in Network Layer**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG4(Quality education) SDG8(Decent work and economic growth)				

Part B

Modules	Contents	Pedagogy	Hours
1	Data Communication System: Purpose, Components: Source, transmitter, transmission System, receiver, and destination. Line Configurations, Signal Representation, Parallel and Serial Data Transmission, Asynchronous and Synchronous Modes of Data Transmission. Digital Signal Encoding, Channel Coding	LECTURING	12
2	Analog and digital data transmission. Data and signal. Analog and digital Signaling of analog and digital data. Modem, Modulation techniques, CODEC, Digital Transmitter etc. Introduction to Network, OSI reference model, TCP/IP reference model. Transmission Media: Magnetic Media, Twisted-Pair cables, Baseband & Broadband Coaxial cables, Fiber Optics. Wireless Transmission: Radio Transmission, Microwave Transmission	PBL	12
3	ISDN; ATM; Data Link Layer: Services, Framing, Error Control, Error- detecting & Correcting Codes. Data Link Protocols: Stop-and-Wait Protocol, Sliding Window Protocol. HDLC; Static & Dynamic Channel allocation in LANs & MANs. Multiple Access Protocols: ALOHA, CSMA/CD	CASE STUDY	13
4	IEEE standards 102.3 and Ethernet, 102.4: Token Bus; 102.5: Token Ring. Bridges, Routers, Gateways, Routing Algorithm, Congestion control Algorithm, Internetworking, The TCP/IP Protocol ,IP Addressing, Subnets.	LECTURING	13
5	Wide Area Network: Introduction, Network routing, Routing Tables, Types of routing, Dijkstra's Algorithm, Bellman-Ford Algorithm, Link state routing, Open shortest path first, Flooding, Broadcasting, Multicasting,Internet Protocols, Overview of TCP/IP, Transport protocols, Elements of Transport Protocol, Transmission control protocol (TCP), User data- gram protocol (UDP).	LECTURING	10

Part C



Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Behrouz A. Data Communications and Networking. Andrew S. Tanenbaum Computer Networks; Pearson Prentice Hall
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Course Articulation Matrix

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CO2	1	-	-	-	2	-	-	-	-	-	-	-	3	2	2
CO3	2	-	-	-	1	-	-	2	-	-	-	-	3	2	2
CO4	-	-	-	2	2	2	-	2	-	-	1	1	2	2	2
CO5	-	-	-	1	-	-	2	-	1	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	Cyber laws
Course Code	DSE701

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					4	0	0	4
Course Type	Theory only							
Course Category	Disciplinary Minor							
Pre-Requisite/s	General understanding of cyber space , computer network.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Understand the structure of cyber space and network, Information Technology and law in general. **(BL2-Understand)** **CO2-** Apply IT act on Pseudo case studies.**(BL3-Apply)** **CO3-** Analyze the type of a digital crime with reference to the provisions in IT Act 200 and 2008.**(BL4-Analyze)** **CO4-** Understand IT Act 2000 of India along with some other countries.**(BL1-Remember)** **CO5-** Evaluate the impact of a digital crime on the victim and the provision punishment to the accused.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**					

Part B

Modules	Contents	Pedagogy	Hours
1	Cyber Technology: Understanding the Cyber Technology, Technology and Law, Constraint and Scope of Cyber Laws Evolution of the IT Act 2000, Genesis and Necessity	Lectures with whiteboard/PPT, Recorded video/interactive videos, case study	4
2	Penalties &Offences under IT Act Amendments under IT Act and Impact on other related Acts (Amendments): (a) Amendments to Indian Penal Code. (b) Amendments to Indian Evidence Act. (c) Amendments to Bankers Book Evidence Act. (d) Amendments to Reserve Bank of India Act.	Lectures with whiteboard/PPT, Recorded video/interactive videos, case study	4
3	Cyber Appellate Tribunal with Special Reference to the Cyber Regulation Appellate Tribunal (Procedures) Rules 2000, The Information Technology (Procedures and Safeguards for Interception, Monitoring and Decryption of Information) Rules, 2009 and Corresponding International Legislation in US, UK and Europe, The Information Technology (Procedures and Safeguards for Blocking the access of Information by Public) Rules, 2009 and Corresponding International Legislation in US, UK and Europe, The Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules, 2009 and Corresponding International Legislation in US, UK and Europe	Lectures with whiteboard/PPT, Recorded video/interactive videos, practical problems	4
4	Cyber and Cyber Space with reference to Democracy and Sovereignty, Developments in Cyber law Jurisprudence, Role of law in Cyber World: Regulation of Cyber Space in India Cyber Space Jurisdiction (a) Jurisdiction issues under IT Act, 2000. (b) Traditional principals of Jurisdiction (c) Extra- terrestrial Jurisdiction (d) Case Laws on Cyber Space Jurisdiction (e) Taxation issues in Cyberspace	Lectures with whiteboard/PPT, Recorded video/interactive videos	4
5	Cyber Space Jurisdiction (a) Jurisdiction issues under IT Act, 2000. (b) Traditional principals of Jurisdiction (c) Extra- terrestrial Jurisdiction (d) Case Laws on Cyber Space Jurisdiction (e) Taxation issues in Cyberspace	Lectures with whiteboard/PPT, Recorded video/interactive videos, Practical Labs	4

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
1-2	Assignment	Case Study	BL2-Understand	2
3-4	Quiz	PBL	BL3-Apply	1
5	Case Based Activity	Field work	BL4-Analyze	4

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**

Part E

Books	Sharma, V. (2011, January 1). Information Technology Law and Practice. Universal Law Publishing.
Articles	
References Books	Duggal, P. (2014, January 1). Legal Framework on Electronic Commerce and Intellectual Property Rights in Cyberspace
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	1	1	2
CO2	1	-	-	-	2	-	-	-	-	-	-	-	3	2	2
CO3	2	-	-	-	1	-	2	-	-	-	-	-	3	2	2
CO4	-	-	-	2	2	2	-	2	-	-	1	1	2	2	2
CO5	-	-	1	-	2	-	1	-	-	-	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Syllabus-2024-2025

(SOS)(BSc_ComputerScience)

Title of the Course	DSE0702
Course Code	Image processing

Part A

Year	4th	**Semester**	7th	**Credits**	L	T	P	C
					3	0	1	4
Course Type	Embedded theory and lab							
Course Category	Generic Elective							
Pre-Requisite/s	Prerequisite: student must be familiar with the following: ❖ Undergraduate level mathematics. ❖ Programming in MatLab.			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** To remember various concept of digital image processing.**(BL1-Remember)** **CO2-** To understand the fundamental concepts of a digital image processing system.**(BL2-Understand)** **CO3-** Apply the concepts learnt in to design and implement with Matlab algorithms for digital image processing operations such as histogram equalization, enhancement, restoration and filtering.**(BL3-Apply)** **CO4-** Analyze the concept of designing after applying these techniques in various applications.**(BL4-Analyze)** **CO5-** Evaluate the theoretical knowledge and practical skills on digital image processing. **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies)				

Part B

Modules	Contents	Pedagogy	Hours
1	Digital Image Introduction: Steps in Digital Image Processing and the Need for Digital Image Processing, Application and Components of Image Processing System. Visual Preliminaries: Brightness Adaptation and Contrast, Neighborhood of pixel, D4, D8 and Dm distances, Adjacency, path and connectivity.	Lecturing	15
2	Image Processing Image Enhancement: Contrast Stretching, Smoothing, Image Averaging, Mean Filter, Ordered Statistic Filter: Median Filter, Low Pass Filtering. Image Sharpening, High, Pass Filtering, Homomorphic Filtering.	Lecture and experiments	10
3	Image Transformation Basic Intensity Transformation Functions, Histogram, Histogram Equalization, Histogram Matching, Spatial Correlation and Convolution Error Criterion: Lossy Compression methods, loss –less compression, Huffman coding, Run length coding- Block coding, Quad Tree coding-contour coding.	Lecture and experiments	15
4	Color Processing and Image Segmentation: Color Fundamentals, RGB, CMY and HSI Color Models, Image Segmentation: Edge Models, Edge Detection, Global and Variable Thresholding, Single and Multiple Thresholds, Region Based Segmentation.	Lecture and experiments	10
5	Morphology, Representation and Description: Mathematical Morphology, Erosion and Dilation, Opening and Closing, Boundary Extraction algorithm. Border Following Algorithm, Chain Codes, Minimum Perimeter Polygons, Boundary Descriptors, Regional Descriptors.	Lecture and experiments	15

Part C

PBL Submission Guideline

Sr. No.	Submission to be done	Submission Required	Marks Allotment
1	Select Project Topic and team submission	Small presentation	2
2	Introduction & Objective of Project	PBL file	3
4	Background Study and the existing gap in particular area	PBL file	5
5	System Design (Flowcharts/Block Diagrams/ Algorithms/DFD/ER diagrams), Implementation of code, and submission of running model.	PBL File & Implementation	10
7	Final Project file submission (Strictly as per	Presentation & Viva Voce	10

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	40	60	18	40	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	50	60	30	40	

Part E

Books	Gonzalez, R. C., & Woods, R. E. (2008). Digital Image Processing (3rd ed.). Pearson Education Inc.
Articles	
References Books	Jain, A. K. (1989). Fundamentals of Digital Image Processing. Prentice Hall. Gonzalez, R. C., Woods, R. E., & Eddins, S. L. (2020). Digital Image Processing using Matlab. McGraw Hill Education.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	1	2	-	-	-	2	-	-	2	2	1
CO2	1	-	-	-	1	2	-	-	-	-	-	-	2	2	3
CO3	2	2	-	2	-	-	-	-	-	-	-	-	1	-	2
CO4	1	2	-	1	-	-	-	-	-	-	-	-	1	2	2
CO5	1	2	-	1	-	-	-	-	-	-	-	-	1	-	2
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-