

**Rashtrasant Tukadoji Maharaj Nagpur University (RTMNU)**

**B.Tech.Sem-I**

**(Computer Science & Engineering/ Information Technology/ Computer Technology/Computer Engineering/ Computer Science & Engineering (Data Science)) /Computer Science & Engineering (Cyber Security)/ Computer Science & Engineering (Artificial Intelligence and Machine Intelligence) W.e.f. 2024-25**

S N	Course Category	Name of Course	Course Code	Teaching Scheme (hrs.)			Total Credit	Examination Scheme							BOS
				(Th)	TU	P		Theory				Practical			
								Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.	
1	BSC-I	Essentials of Chemistry	BCB1T01	2	-	-	2	3	70	30	45	-	-	-	AS&H
2	BSC-I	Essentials of Chemistry Lab	BCB1P01	-	-	2	1	-	-	-	-	25	25	25	AS&H
3	BSC-II	Applied Algebra	BCB1T02	3	-	-	3	3	70	30	45	-	-	-	AS&H
4	ESC-I	Problem Solving using ‘C’	BCB1T03	3	-	-	3	3	70	30	45	-	-	-	CS
5	ESC-I	Problem Solving using ‘C’	BCB1P03	-	-	2	1	-	-	-	-	25	25	25	CS
6	ESC-II	Basics of Electronics Engineering	BCB1T04	3	-	-	3	3	70	30	45	-	-	-	ETC
7	ESC-II	Basics of Electronics Engineering	BCB1P04	-	-	2	1	-	-	-	-	-	50	25	ETC
8	VSC-I	Web Design Technology	BVS1P01	-	-	4	2	-	-	-	-	50	50	50	CS
9	AEC-I	Communication Skills	BAE1T01	1	-	-	1	3	35	15	23	-	-	-	AS&H
10	AEC-I	Communication Skills Lab	BAE1P01	-	-	2	1	-	-	-	-	25	25	25	AS&H
11	CC-I	Refer CC Basket	BCC1P01	-	-	4	2	-	-	-	-	-	100	50	
Total				12	-	16	20	15	315	135		125	275		

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## B.Tech.Sem-II

(Computer Science & Engineering/ Information Technology/ Computer Technology/Computer Engineering/Computer Science & Engineering (Data Science))/ /Computer Science & Engineering (Cyber Security)/ / Computer Science & Engineering (Artificial Intelligence and Machine Intelligence) W.e.f. 2024-25

S N	Course Category	Name of Course	Course Code	Teaching Scheme (in Hrs)			Total Credit	Examination Scheme							BOS
				(Th)	TU	P		Theory				Practical			BOS
								Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.	
1	BSC-III	Mathematical foundation of Computer Science	BCB2T05	3	-	-	3	3	70	30	45	-	-	-	AS&H
2	BSC-III	Mathematical foundation of Computer Science using Python	BCB2P05	-	-	2	1	-	-	-	-	25	25	25	AS&H
3	BSC-IV	Essentials of Physics	BCB2T06	3	-	-	3	3	70	30	45	-	-	-	AS&H
4	BSC-IV	Essentials of Physics Lab	BCB2P06	-	-	2	1	-	-	-	-	-	50	25	AS&H
5	ESC-III	Python Programming	BCB2T07	3	-	-	3	3	70	30	45	-	-	-	CS
6	ESC-III	Python Programming Lab	BCB2P07	-	-	2	1	-	-	-	-	25	25	25	CS
7	PCC-I	Computer Architecture and Organization	BCB2T08	2	-	-	2	3	70	30	45	-	-	-	CS
8	SEC-I	Refer to SEC Basket	BSE2P01	-	-	4	2	-	-	-	-	50	50	50	CS
9	AEC-1	Refer to IKS Basket	BIK2T01	2	-	-	2	3	70	30	45	-	-	-	AS&H
10	CC-II	Refer to CC Basket	BCC2P01	-	-	4	2	-	-	-	-	-	100	50	AS&H
Total				13	-	14	20		350	150		100	250	175	

Exit option: Award of UG Certificate in Major with 40 credits and an additional 8 credits in skill-based courses, internship, mini projects etc.

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### SEC Basket

S.No	Semester	Course code	Course Name
1	2 <sup>nd</sup> Sem	BSE2P01	Linux & Shell Programming

### IKS Basket

S No	Code	Name of Subject
1	BIK2T01A	Consciousness Studies
2	BIK2T01B	Preserving Art, Culture and Tradition
3	BIK2T01C	Wellness, traditional medicines and yoga
4	BIK2T01D	Glimpses of ancient Science and Technology

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**First Semester B. Tech. (Computer Science & Engineering/ Computer Engineering/ Information Technology/ Computer Technology/Computer Science & Engineering (Data Science))/ Computer Science & Engineering (Cyber Security)/ Computer Science & Engineering (Artificial Intelligence and Machine Learning)**

Essentials of Chemistry(TH+P)	
Total Credits: 02 T + 01 P	Subject Code : BCB1T01
Teaching Scheme :	Examination Scheme :
Lectures: 2 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks
Practical: 02 Hours/Week	University Assessment: 70 Marks

Course Objectives	
1	To introduce ideas of electrochemistry necessary to understand the function of batteries.
2	To gain an understanding of the rare earth metals and waste handling generated out of their uses.

Course Outcomes	
<b>After completion of syllabus, students would be able to</b>	
1	Students will be able to utilize the basics concepts of battery technology & energy storage devices.
2	Students will learn about rare earth elements, the correct disposal methods of e-wastes and while creating any tool they will keep this environmental aspect in mind.
3	They will know the role of nanomaterials and their applications.
4	Students will inculcate the use of instrumentation techniques and interpret its applications in material characterization.

## SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT 1: Battery Technology</b>			
Electrochemical & Galvanic Series, Electrochemical & Electrolytic cells Battery: Introduction, types-primary, secondary and reserve, Lithium-cobalt oxide and metal air batteries - characteristics, components/materials, working and applications. Super capacitors: Introduction, types (EDLC, pseudo and asymmetric capacitor) with examples and applications. Energy conversion devices: Introduction, characteristics, materials, working and applications of H <sub>2</sub> -O <sub>2</sub> fuel cells, amorphous Si and quantum dye sensitized solar cells.	6		1
<b>UNIT 2: Rare earth elements and E-wastes management</b>			
Rare earth elements: Properties, applications in electronics. Lanthanide	6		2

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contraction.Types of E-wastes, environmental and health risks, segregation and recycling (Hydrometallurgical, pyrometallurgical and direct recycling), Extraction of rare earth and precious metals from e-wastes, Twelve principles of Green Chemistry. Green Computing, Role of Green Computing in Environment and Research, Green devices and Green data Servers.			
<b>UNIT 3: Nonmaterial's</b>			
Introduction, classification, size dependent properties, surface area, optical and catalytic properties,Synthesis methods of nanomaterials- Top down and bottom-up approach. Carbon nanomaterials: Types, properties and applications of CNT and graphene. Applications of nano materials.	6		3
<b>UNIT 4: Material Characterization Techniques</b>			
<b>Principles and applications of –</b> Electronic Spectroscopy (Beer-Lambert's law and its numerical), Infra-Red spectroscopy and Nuclear Magnetic Resonance spectroscopy. Thermal analysis (Thermogravimetry, Differential Thermal Analysis, Differential Scanning Calorimetry), Scanning Electron Microscopy, Transmission Electron Microscopy, Atomic Force Microscopy, Brunauer-Emmett-Teller (BET) surface area analysis, X-ray Diffraction Analysis, particle size analyser (Dynamic Light Scattering), High Performance Liquid Chromatography and Gas Chromatography	6		4

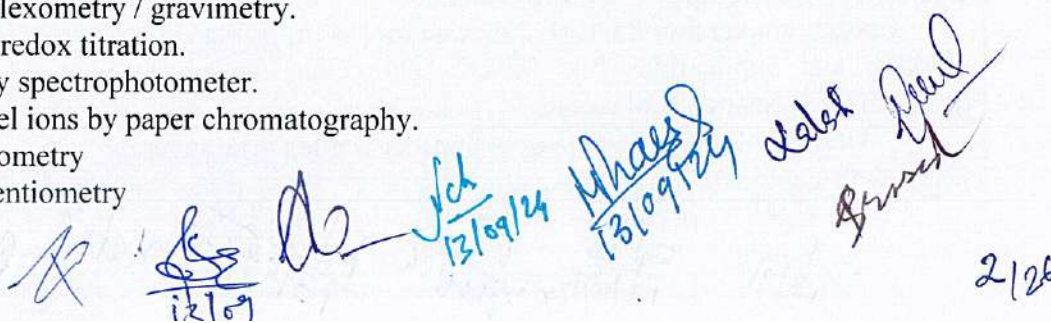
#### References :

1. M AfsharAlam, Sapna Jain, HenaParveen, Green Computing Approach Towards Sustainable Development, Wiley Interscience Publications.
2. S. S. Dara, A Textbook of Engineering Chemistry, S. Chand Publications
3. ShikhaAgrawal, Engineering Chemistry: Fundamentals and Applications, Cambridge University Press.
4. Supercapacitors and Their Applications Fundamentals, Current Trends, and Future Perspectives, Edited By Anjali Paravannoor, Baiju K.V, CRC Press
5. The Rare Earth Elements: An Introduction, JHL Voncken, Springer Link

Essentials of Chemistry Lab			
<b>Course Code:</b>	<b>BCB1P01</b>	<b>Credits:</b>	<b>01</b>
<b>Teaching Hours / Week</b>	<b>02 P</b>	<b>SEE</b>	<b>25 M</b>
<b>Total number of teaching hours</b>	<b>24</b>	<b>Course Category</b>	<b>BSC</b>
<b>BoS</b>	<b>AS&amp;H</b>	<b>CIE</b>	<b>25M</b>
<b>Credits</b>	<b>01</b>		

#### List of Practical (Any 6-performance based and 1 virtual lab experiment)

1. Estimation of Copper estimation (iodometrically)
2. Estimation of Ni by complexometry / gravimetry.
3. Fe(II)/ (III) estimation by redox titration.
4. Beer's Law verification by spectrophotometer.
5. Separation of copper nickel ions by paper chromatography.
6. Redox titration by potentiometry
7. Acid base titration by potentiometry


  
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8. Acid base titration by conductometry
9. Virtual Lab: Experiment on Chromatography
10. Virtual Lab: Experiment on Spectroscopy

Applied Algebra	
<b>Total Credits: 03T</b>	<b>Subject Code : BCB1T02</b>
<b>Teaching Scheme :</b>	<b>Examination Scheme :</b>
<b>Lectures: 3 Hours/Week</b>	<b>Duration of University Exam : 03 Hrs.</b>
<b>Tutorials: 0 Hours/Week</b>	<b>College Assessment: 30 Marks</b>
	<b>University Assessment: 70 Marks</b>

Course Objectives	
1	The aim of this course is to acquaint aspiring engineers with methods in differential, integral, and linear algebra.
2	It seeks to provide students with common concepts and resources that will enable them to manage mathematics and its applications with ease and become proficient in their field.

Course Outcomes	
<b>After completion of syllabus, students would be able to</b>	
1	To apply knowledge of matrices and linear algebra in a comprehensive manner
2	To exhibit knowledge of the fundamental concepts of linear algebra, such as inner product space, bases and dimensions, vector space, subspace, linear transformations, and inner product space.
3	To solve engineering problem by using knowledge of differentiation.
4	To analyze length, area, volume using knowledge of curve tracing.
5	To evaluate series and sequences based on their convergence and type.

## SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I : Linear Algebra I</b>			
Linear dependence of vectors, Eigen values and Eigen vectors; Reduction to diagonal form, Largest Eigen value and its corresponding Eigen vector by iteration method, Gaussian elimination, LU Decomposition (Crout's method).	7		1
<b>UNIT II : Linear Algebra II</b>			
Vector Space; Subspaces; Basis; Dimension; Linear transformation; Range Space and Rank; Null Space and Nullity; Rank nullity theorem, Matrix Representation of a linear transformation; <b>Inner Product Spaces:</b> Norm; Orthonormal Sets, Positive definite matrices, Singular Value Decomposition, Gram-Schmidt process.	7		2
<b>UNIT III : Differential Calculus</b>			
Successive differentiation: Leibnitz's Rule, Taylor's and Maclaurin's	7		

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series for function of one variable, Indeterminate forms and L'Hospital's Rule, Maxima and Minima for function of one variable, continuity of functions; differentiability, Rolle's theorem, Mean value theorem.			
<b>UNIT IV : Integral Calculus</b>			
Beta and Gamma functions and their properties. Curve Tracing: Tracing of curves (Cartesian), Applications of definite integrals to find length of the curve, area, volume & surface area of revolution.	8		4
<b>UNIT V :Sequence and Series</b>	7		
Sequence, types of sequence, test of convergence of sequences, Cauchy sequence, infinite series, power series, Alternating series, tests of convergence and absolute convergence of series.			5

#### References:

1. Hoffman and Kunze: Linear Algebra, Prentice Hal of India, New Delhi.
2. H. K. Dass, Advanced Engineering Mathematics, S. Chand, Reprint, 2014.
3. Murray Spiegel, John Schiller, R. A. Srinivasan, Probability and Statistics, Schaum's
4. Outline Series, McGraw Hills, 4th Edition, 2016.

#### Reference books:

1. GilbertStrang: Linear Algebra And Its Applications (Paperback), Nelson Engineering (2007)
2. ErwinKreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Problem Solving using 'C'	
<b>Total Credits: 03 T</b>	<b>Subject Code : BCB1T03</b>
<b>Teaching Scheme :</b>	<b>Examination Scheme :</b>
<b>Lectures: 3 Hours/Week</b>	<b>Duration of University Exam : 03 Hrs.</b>
<b>Tutorials: 0 Hours/Week</b>	<b>College Assessment: 30 Marks</b>
<b>Practical: 02 Hours/Week</b>	<b>University Assessment:70 Marks</b>

Course Objectives	
1	Design solutions to simple engineering problem by applying the basic programming principles of C language and basic mathematical knowledge.
2	Develop simple C programs to illustrate the applications of different data types such as arrays, pointers, functions.

Course Outcomes	
<b>After completion of syllabus, students would be able to</b>	
1	Illustrate and explain the basic computer concepts and programming principles of C language.
2	Develop C programs to solve simple mathematical and decision making problems.
3	Develop C programs to solve simple engineering problems using looping constructs.
4	Develop C programs to demonstrate the applications of derived data types such as arrays, pointers, strings and functions.
5	Use and create functions for modular programming

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## SYLLABUS

Details of Topic		Allotment of Hours		Mapped with CO Number
		L	T/A	CO
<b>UNIT I :</b>				
<b>UNIT I :</b> <b>Introduction to Programming:</b> Importance of C, Basic Structure of C Programs, Programming Style, Executing a C Program. <b>Constants, Variables, and Data Types:</b> Introduction ,Character Set ,C Tokens, Keyword sand Identifiers ,Constants, Variables, Data Types ,Declaration of Variables, Assigning Values to Variables, Defining Symbolic Constants <b>Managing Input and Output Operations:</b> Reading a Character, Writing a Character, Formatted Input, Formatted Output. <b>Operators and Expressions:</b> Introduction, Arithmetic Operators, Relational Operators ,Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operator, Bitwise Operators, Special Operators, Arithmetic Expressions ,Evaluation of Expressions, Precedence of Arithmetic Operators, Type Conversions in Expressions, Operator Precedence and Associativity.		7		1
<b>UNIT II :</b>				
Decision Making and Branching: Introduction, Decision Making with IF Statement, Simple IF Statement, the IF.....ELSE Statement, Nesting of IF....ELSE Statements, The ELSE IF Ladder, The Switch statement. Decision Making and Looping: The WHILE Statement, The DO Statement, the FOR Statement, Jumps in LOOPS.		7		2
<b>UNIT III :</b>				
<b>Arrays:</b> <b>One-dimensional Arrays,</b> Declaration of One-dimensional Arrays, Initialization of One-dimensional Arrays, Example programs- Linear search, Binary search, Bubble sort, Selection sort. <b>Two-dimensional Arrays,</b> Declaration of Two-dimensional Arrays, Initialization of Two- dimensional Arrays, Example programs – Matrix Multiplication, Transpose of a matrix.		7		3
<b>UNIT IV :</b>				
<b>Character Arrays and Strings :</b> Declaring and Initializing String Variables, Reading Strings from Terminal ,Writing Strings to Screen ,Arithmetic Operations on Characters, String-handling Functions (strlen(), strcpy(), strcmp(), strcat(), strrev()), Example Programs(with and without using built-in string functions), Two-dimensional character arrays. <b>Pointers :</b> Introduction,DeclaringPointerVariables,InitializationofPointervariables,accessing a Variable through its Pointer, Pointer Expressions, Pointer Increments and ScaleFactor,Pointers and1-D Arrays.		8		4
<b>UNIT V :</b>				
<b>User-defined Functions:</b> Elements of User-defined Functions, Definition of Functions, Return Values and their Types, Function Calls, Function Declaration,		7		5

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Category of Functions, No Arguments and no Return Values, Arguments but no Return values, Arguments with Return Values, No Arguments but Returns a Value, Passing Arrays to Functions. Recursion - Factorial of an integer, Xn, Finding nth Fibonacci numbers.		
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### Reference Books :

1.	E.Balagurusamy	Programming in ANSI C, 5 <sup>th</sup> Edition, Tata McGraw-Hill Publications
2.	PB Kottur	Computer Concepts and C Programming
3.	Kerningham Dennis Ritchie	The C programming language (ANSI C version), 2 <sup>nd</sup> Edition, PHI India
4.	Jeri R Hanly Elliot B Koffman	Problem solving and program design in C Person Addison Wesley 2006
5	Yashwant Kanetkar	Let us C, 6 <sup>th</sup> Edition, BPB publication

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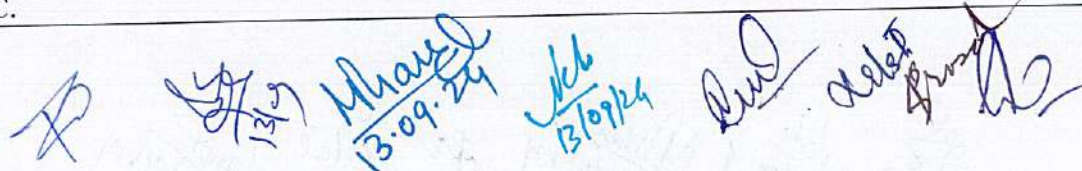
1. <https://www.w3schools.com/c/>
2. <https://www.tutorialspoint.com/cprogramming/index.htm>
3. <https://www.geeksforgeeks.org/c-programming-language/>

Problem Solving using 'C'	
Total Credits: 01	Subject Code : BCB1P03
Teaching Scheme :	Examination Scheme :
Lectures: 2 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 25 Marks
Practical: 02 Hours/Week	University Assessment: 25 Marks

The laboratory programs should be executed on CodeBlocks IDE using GCC Compiler. (Select any 10 Experiments)

Course Objectives	
1	Understand the basic principles of C programming language.
2	Develop C programming skills.
3	Develop debugging skills using Code Blocks IDE.

Course Outcomes	
After completion of syllabus, students would be able to	
1	Develop, Debug and Execute programs to demonstrate decision making and looping constructs in.
2	Develop, Debug and Execute programs to demonstrate the applications of arrays in C.
3	Develop, Debug and Execute programs to demonstrate the applications of functions in C.
4	Develop, Debug and Execute programs to demonstrate the basic concepts of pointers in C.


  
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### Laboratory Programs:

1. Develop a C Program to find the roots of quadratic equation for non-zero co-efficient using if-else ladder construct.
3. Develop a C Program to conduct Binary search for a key element over an array of n integer elements. Report success or failure with appropriate messages.
5. Develop a C Program to implement a simple calculator to perform addition, subtraction, multiplication and division operations using switch construct. Display appropriate messages for invalid operator and divide by zero error.
8. Develop a C program to read n elements into an integer array and sort the array using Bubble sort technique. Print the input array and the resultant array with suitable messages.
10. Develop a C Program to generate the Prime numbers between the ranges m & n using nested for loop construct. Also, print the number of prime numbers generated.
12. Develop a recursive C function to find the factorial of a number,  $n!$ , defined by  $\text{fact}(n)=1$ , if  $n=0$ . Otherwise  $\text{fact}(n)=n*\text{fact}(n-1)$ . Using this function, develop a C program to compute the Binomial coefficient  $nCr$ . Perform input validation as well.
14. Develop a C Program to find the GCD & LCM of two integers using Euclid's algorithm.
16. Develop a C program to find the smallest and largest elements in an array using pointers and then swap these elements and display the resultant array.
18. Develop a C program to find the Sine of an angle for the given n terms using the series  $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \dots$  n terms.
20. Develop a C program to read two matrices A (m x n) and B (p x q) and compute the product of the two matrices. Print both the input matrices and resultant matrix with suitable headings and output should be in matrix format only. Program must check the compatibility of orders of the matrices for multiplication. Report appropriate message in case of incompatibility.
22. Develop a C program to find the sum of all the elements of an integer array using pointers.
24. Develop a C program to accept a matrix of order m x n. Implement the following functions:
  - Find the sum of each row
  - Find the sum of each column.
  - The sum should be printed in main function only.
25. Develop a C program to count the vowels & consonants in a given string.
26. Develop a C program to perform the following operations using functions:
  - Read n elements into an array,      Print the contents of an array
28. Sort an array of n elements using Selection sort technique

Basics of Electronics Engineering	
Total Credits: 03 T	Subject Code : BCB1T04
Teaching Scheme :	Examination Scheme :
Lectures: 3 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks
	University Assessment: 70 Marks

Course Objectives	
1	To make students understand about Semiconductor devices & its applications, Digital gates, flip-flops, counter and design of simple digital circuit, Microcontroller & its applications.
2	Introduce embedded system and IoT, Analog , digital communication and wireless communication

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### References:

1. S. Salivahanan, N. Suresh Kumar, "Electronic Devices and Circuits", Tata McGraw Hill.
2. A Textbook of Applied Electronics, R S Sedha, S Chand and company
3. The 8051 Microcontrollers & Embedded System, Mazidi, Pearson publications
4. Text Books: 1. "Electronics Devices" by Thomas. L. Floyd, 9th Edition, Pearson (Unit I, II)
5. "Modern Digital Electronics" by R.P. Jain, 4th Edition, Tata McGraw Hill (Unit III)
6. "Sensors and Transducers" by D. Patrnabis, 2nd Edition, PHI (Unit V)
7. Electronic Communication Systems" by Kennedy & Davis, 4th Edition, Tata McGraw Hill (Unit VI)
8. "Mobile Wireless communication" by M. Schwartz, Cambridge University Press (Unit VI)

Basics of Electronics Engineering	
Total Credits: 01	Subject Code : BCB1P04
Teaching Scheme :	Examination Scheme :
Lectures 0 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 50 Marks
Practical: 02 Hours/Week	University Assessment:---

Practical based on above syllabus

Web Design Technology (P)	
Total Credits: 02 P	Subject Code : BVS1P01
Teaching Scheme :	Examination Scheme :
Lectures: 0 Hours/Week	Duration of University Exam :
Tutorials: 0 Hours/Week	College Assessment: 50 Marks
Practical: 04 Hours/Week	University Assessment: 50 Marks

Course Objectives	
1	Students will learn how to create visually appealing and user-friendly websites using a combination of HTML, CSS, and other web technologies.
2	Topics include web development tools, responsive design, accessibility, and best practices for creating modern websites.

Course Outcomes	
After completion of syllabus, students would be able to	
1	Understand the fundamentals of Internet, and the principles of web design.
2	Construct basic websites using HTML and Cascading Style Sheets.
3	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.
4	Develop modern interactive web applications and deploy.

Course Outcomes: After Completing this course students will be able to

### 1. HTML (Hypertext Markup Language)

- Basic HTML Structure
- Text Formatting and Semantic Elements

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- Lists and Links
  - Forms and Input Elements
- 2. CSS (Cascading Style Sheets)**

- Introduction to CSS
- Selectors and Properties
- Layout and Positioning
- CSS Box Model

**3. Responsive Web Design**

- Media Queries
- Fluid Layouts
- Flexbox and Grid Layout
- Mobile-First Design

**4 : Web Typography**

- Font Families and Styles
- Web Fonts and Icons
- Typography Best Practices

**5 : Images and Multimedia**

- Image Formats and Optimization
- Working with Images in HTML and CSS
- Embedding Audio and Video

**6 : Web Accessibility**

- Accessibility Principles and Guidelines
- ARIA Roles and Attributes
- Testing for Accessibility
- Designing for All Users

**7 : Web Development Tools**

- Text Editors and Integrated Development Environments (IDEs)
- Version Control with Git and GitHub
- Browser Developer Tools
- Debugging and Testing

**8 : Advanced Topics**

- CSS Preprocessors (e.g., Sass)
- JavaScript Basics
- Introduction to Content Management Systems (CMS)
- Web Hosting and Deployment

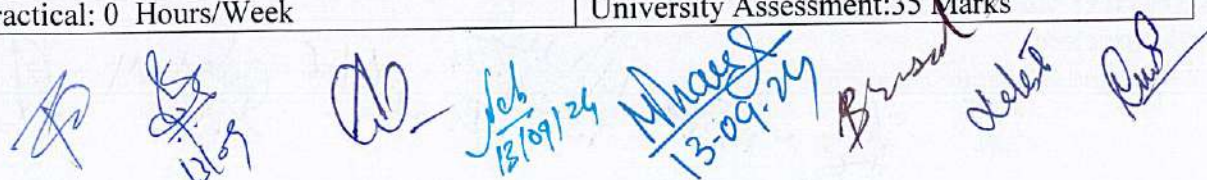
**Reference Books :**

1. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, DT Editorial, Dreamtech press
2. MASTERING HTML, CSS & JavaScript Web Publishing, Laura Lemay (Author), Rafe Colburn (Author), Jennifer Kyrnin (Author), BPB Publication

**URL:**

1. <https://www.flux-academy.com/free-resources>
2. <https://wordpress.com/website-builder/>

Communication Skills(T)	
Total Credits: 01 T	Subject Code : BAE1T01
Teaching Scheme :	Examination Scheme :
Lectures: 1 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 15 Marks
Practical: 0 Hours/Week	University Assessment: 35 Marks


  
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Course Objectives	
1	Basic knowledge of Communication Skills
2	Students would be able to enhance their communication skills.

Course Outcomes	
After completion of syllabus, students would be able to .	
1	Construct grammatically correct sentences.
2	Identify and overcome barriers of communication
3	Demonstrate good Listening and speaking skills.
4	Develop effective reading and writing skills.

### SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I :</b>			
Grammar: Tenses and its types, sentences and its Types, Transformation of Sentences (Assertive, Affirmative, Negative, Interrogative, Exclamatory) Reported speech	4		1
<b>UNIT II :</b>			
Introduction to Communication, Importance of communication Types of communication -Verbal and non-verbal Communications: - Kinesics, Vocalics, Chronemics, Haptics, Proxemics), Barriers to communication and methods to overcome them.	3		2
<b>UNIT III :</b>			
Introduction to LSRW Skills-, Listening Skills: Importance of listening, Types of listening,listening barriers and methods to overcome, Speaking Skills: Components of public speaking,Essential steps for public speaking, Overcoming stage fear in public speaking, Do's, and Don'ts of Public speaking	4		3
<b>UNIT IV :</b>			
Reading Skills: Importance of reading skills, Types of reading, comprehending passages,Writing Skills: Importance of effective writing, Paragraph writing, Email etiquettes.	3		4

#### Reference books:

1. Technical Communication by Meenakshi Raman and Sangeeta Sharma, OUP
2. Public Speaking and Influencing Men in Business by Dale Carnegie
3. Professional Communication Skills by Bhatia and Sheikh, S. Chand Publications
4. Communication Skills by Sanjeev Kumar and Pushpalata, OUP
5. Communication Skills by LalitaBisen, BhumikaAgrawal, N. ThejoKalyani, Himalaya Publishing House

#### Communication Skills Lab

Communication Skills Lab	
Total Credits: 01	Subject Code : BAE1P01
Teaching Scheme :	Examination Scheme :
Lectures: 0 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 25 Marks

**List of Experiments: (Perform any 6 – 8 Practical)**

- a. Barriers to Communication
- b. Non-verbal Communication
- c. Listening Skills
- d. Reading Skills
- e. Speaking Skills
- f. Presentation Skills
- g. Group Discussion
- h. Interview Techniques

**Beyond/Additional Syllabus Experiments**

- a. Development of Word Power
- b. Use of Figurative language

**Suggested Textbooks/Reference Books/ Web page (URL)/Research paper, etc.**

1. Technical Communication by Meenakshi Raman and Sangeeta Sharma, OUP
2. Public Speaking and Influencing Men in Business by Dale Carnegie
3. Professional Communication Skills by Bhatia and Sheikh, S. Chand Publications
4. Communication Skills by Lalita Bisen; Bhumiika Agrawal, N. Thejo Kalyani, Himalaya



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Community Based Participatory Research			
Course Code:	BCC1P01	Credits:	02
Teaching Hours / Week	04 P	SEE	100 M
Total number of teaching hours	60	Course Category	CC/LL
BoS	AS&H / Branch		

### Course Outcome:

- Gain an understanding of rural life, Indian culture and ethos and social realities
- Develop a sense of empathy and bonds of mutuality with the local community
- Appreciate significant contributions of local communities to Indian society and economy
- Learn to value the local knowledge and wisdom of the community
- Identify opportunities for contributing to community's socio-economic improvements.

#### Unit – I

##### Appreciation of Rural Society:

Rural lifestyle, rural society, caste and gender relations, rural values with respect to community, nature and resources, elaboration of “soul of India lies in villages’ (Gandhi), rural infrastructure.

**Task to perform** - Prepare a map (physical, visual or digital) of the village you visited and write an essay about interfamily relations in that village. – Classroom discussions – Field visit\*\* – Assignment Map

#### Unit – II

##### Understanding rural and local economy and livelihood:

Agriculture, farming, land ownership, water management, animal husbandry, non-farm livelihoods and artisans, rural entrepreneurs, rural markets, migrant labour.

**Task to perform** - Describe your analysis of the rural house hold economy, its challenges and possible pathways to address. Circular economy and migration patterns. – Field visit\*\* – Group discussions in class – Assignment

#### Unit – III

##### Rural and local Institutions:

Traditional rural and community organisations, Self-help Groups, Panchayati raj institutions (Gram Sabha, Gram Panchayat, Standing Committees), Nagarpalikas and municipalities, local civil society, local administration.

**Task to perform** - How effectively are Panchayati Raj and Urban Local Bodies (ULBs) institutions functioning in the village? What would you suggest to improve their effectiveness? Present a case study (written or audio-visual). – Classroom – Field visit\*\* – Group presentation of assignment

#### Unit – IV

##### Rural and National Development Programmes:

History of rural development and current national programmes in India: SarvaShikshaAbhiyan, BetiBachao, BetiPadhao, Ayushman Bharat, Swachh Bharat, PM AwaasYojana, Skill India, Gram PanchayatDecentralised Planning, National Rural Livelihood Mission (NRLM), Mahatma Gandhi National Rural Employment Guarantee Act 2005 (MGNREGA), SHRAM, JalJeevan Mission, Scheme of Fund for Regeneration of Traditional Industries (SFURTI), AtmaNirbhar Bharat, etc

**Task to perform** - Describe the benefits received and challenges faced in the delivery of one of these programmes in the local community; give suggestions about improving the implementation of the programme for the poor. Special focus on the urban informal sector and migrant households. – Classroom – Each student selects one program for field visit\*\* – Written assignment

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**\*\* Recommended field-based practical activities:**

- Teaching and Learning Methods:**

An ICT based online module needs to be prepared for self-paced learning by students for one credit which can be supplemented through discussions in the classroom.

Reading and classroom discussions, Participatory Research Methods and Tools, Community dialogues, Oral history, social and institutional mapping, interactions with elected panchayat leaders and government functionaries, Observation of Gram Sabha, Field visits to various village institutions (see Section -3 Implementation Strategy).

Section 3 Implementation Strategy:

**SECOND SEMESTER B.Tech. (Computer Science & Engineering/ Computer Engineering/  
Information Technology/ Computer Technology)**

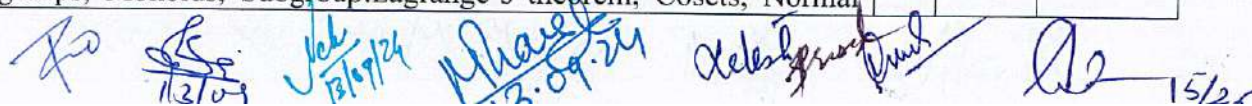
<b>Mathematical foundation of Computer Science (TH)</b>	
Total Credits: 03 T	Subject Code : BCB2T05
Teaching Scheme :	Examination Scheme :
Lectures: 3 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks
	University Assessment: 70 Marks

<b>Course Objectives</b>	
1	Develop mathematical and logical thinking for enhancing computational power of the students.
2	Equipped the students with fundamental mathematical tools used in computer science.

<b>Course Outcomes</b>	
<b>After completion of syllabus, students would be able to</b>	
1	Define mathematical structures, relations, functions and use them to model real life situations.
2	Apply the concept of sets & fuzzy logics in their computer domain.
3	Interpret the data in mathematical form
4	Analyze basic facts of algebraic structures.
5	Implement the concept of counting principles.

**SYLLABUS**

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I : Relations and Functions</b>			
<b>Relations:</b> Ordered pairs and n-tuples, Types of relations, Composite relation, Transitive closure of a relation, Partially ordered set, Hasse diagrams. <b>Functions:</b> Definition, Composition of functions, Types of functions, Characteristics function and its properties.	8		1
<b>UNIT II : Set Theory &amp; Fuzzy Logic</b>			
<b>Sets:</b> Review of sets, Types and operations on sets, Principle of mathematical induction, <b>Fuzzy sets:</b> Fuzzy sets and systems, Crisp set, Operations and combinations on Fuzzy sets, Relation between Crisp set and Fuzzy set, Fuzzy relations, Overview of Fuzzy logic and classical logic.	7		2
<b>UNIT III : Curve Fitting</b>			
Fitting of a Curve by Method of Least Squares: Straight line $y = a+bx$ , Second degree parabola $y = a+bx+cx^2$ and curves of the type $y = ae^{bx}$ , $y = ab^x$ and $y = ax^b$ , Coefficient of correlation and Lines of regression, Rank correlation.	7		3
<b>UNIT IV : Algebraic Structures</b>			
Introduction, Algebraic Systems, Groups, properties of algebraic groups, Semi groups, Monoids, Subgroup. Lagrange's theorem, Cosets, Normal	8		4


  
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Subgroup, quotient group, Homomorphism, Isomorphism of semigroup, monoid.			
<b>UNIT V : Elementary Combinatorics</b>	7		5
Basics of counting techniques, Pigeonhole principle, Definition of generating functions and examples, Recurrence relations: definitions & examples, Solving Linear Recurrence Relations, Inclusion and Exclusion principle.			

- REFERENCES**
1. Discrete Mathematical Structures with Applications to Computer Science, J .P.Trembley and R. Manohar, Tata McGraw Hill-35th reprint, 2017.
  2. Discrete Mathematical Structures, Kolman, R.C. Busby and S.C. Ross, 6th Edition, PHI, 2018
  3. K.H. Rosen, Discrete Mathematics and its Applications, Mc-Graw Hill Book Company, 1999.

<b>Mathematical foundation of Computer Science using Python(PRACTICAL)</b>	
Total Credits: 01	Course Code : BCB2P05
Teaching Scheme :	Examination Scheme :
Practical: 02 Hours/Week	College Assessment: 25 Marks
	University Assessment: 25 Marks

**Practical Course Objectives:**

Solving problems using PYTHON Programming Language

**Practical Course Outcomes:**

After completing the practical course, students will be able to solve the following using PYTHON Programming Language.

CO1	Describe the components of a computer and notion of an algorithm.
CO2	Apply suitable programming constructs and built-in discrete mathematics to solve a problem.
CO3	Develop, document, and debug modular python
CO4	Use classes and objects in application on programs and visualize data

SR.NO	Title of Experiment/ Practical
1	Introduction to Python Programming
2	Basic Commands.
3	Functions, Relations & their Graphs.
4	Fitting of Straight line, parabola & exponential curve to the data
5	Coefficient of correlation
6	Recurrence Relation.
7	Lattices and Boolean Algebra.


  
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8	Counting techniques
9	Student activity

Essentials of Physics	
Total Credits: 03 T	Subject Code : BCB2T06
Teaching Scheme :	Examination Scheme :
Lectures: 3 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks
	University Assessment: 70 Marks

Course Objectives	
1	To introduce ideas of quantum mechanics necessary to understand the function of quantum computing
2	To gain an understanding of the total internal reflection in optical communication system

Course Outcomes	
After completion of syllabus, students would be able to	
1	Learn the basic concepts of the dual nature of matter, differentiate between bits and qubits, and apply them to analyze various relevant phenomena in Quantum Computers and solve related numerical problems.
2	Relate the basic idea of total internal reflection to the propagation of light in an optical fiber and make use of the fiber concepts to solve numerical problems and relate to applications in engineering
3	Identify and explain different types of diodes, transistors, and their applications
4	Find how to extend the basic concepts of motion of charged particles in electric magnetic fields to solve numerical problems and to relate to applications in electron optic devices and CRO
5	Learn and explain nanoscience and its properties related to bulk materials

### SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I : Quantum Computing</b>			
Introduction to bits and qubits. Difference in bits and qubits. Quantum entanglement, Brief introduction about quantum computers Concept of wave-particle duality, De-Broglie Hypothesis, Matter Waves, Davisson-Germer Experiment Concept of wave packets, Heisenberg Uncertainty Principle. Schrodinger wave equation (time dependent and time independent), Wave function $\Psi$ , probability function, normalization condition, Eigen values, eigen function, Application to one dimensional infinite potential well.	7		1
<b>UNIT II : Optical fiber</b>			
Structure of optical fiber, total internal reflection, modes of propagation,	7		2


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Graded index profile, Numerical aperture, classification of optical fiber, Acceptance angle and cone, attenuation and dispersion, fiberoptic communication system.			
<b>UNIT III : Semiconductor Physics</b>			
Classification of materials on the basis of band gap, conductivity, drift and diffusion current intrinsic and extrinsic semiconductors. Diode and types of diodes: PN junction, Zener diode, LED, Tunnel diode, Photo diode, transistors, common base, common emitter configurations.	7		3
<b>UNIT IV : Electron optics</b>			
Motion of electron in magnetic and electric field, Bethe's law, Electrostatic lens, Block diagram and functions of each part of CRT and CRO, trigger circuit, time base circuit applications of CRO	8		4
<b>UNIT V : Nanotechnology</b>			
Concept of nanotechnology, Top-down and bottom-up approach, comparison of properties of bulk and nanomaterials, sol gel and ball mill process, special types of materials, Zeolite and Graphene, applications of nanotechnology.	7		5

### Reference Books

1. P. M. Mathews and K. Venkatesan, A Textbook of Quantum Mechanics, Tata McGraw Hill (1977).
2. J. L. Powell and B. Crasemann, Quantum Mechanics, Narosa Publishing House (1993).
3. Charles Kittel, Introduction to Solid State Physics, Wiley Eastern, 5th edition, (1983).
4. A. J. Dekker, Solid State Physics, Prentice Hall of India (1971).
5. A Textbook of Engineering Physics, Dr. M. N. Avdhanulu, Dr. P. G. Kshirsagar, S. Chand Publication
6. Text book of Applied Physics, Dr. D. S. Hardas, Dr. D. S. Bhoomik, Dr. S. Shastri, Das Ganu Publication ISBN-978-93-84336-59-2 (2021)
7. Applied Physics, M. N. Avdhanulu, Shilpa A. Pande, Arti R. Golhar, Mohan Giriya, S. CHAND
8. A Text Book of Engineering Physics Dr. Devashree Hardas & Dr. Ashish Panat, Das Ganu Publication ISBN-978-81-921757-7-5 (2011)
9. Applied Physics, - Dr. (Mrs) S.P. Wankhede, Dr. Shruti Patle, Dr. (Mrs.) S.U. Bhonsule and Dr. N. S. Ugemuge DNA Publication ISBN-978-81-945174-6-7 (2020)
10. Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles by R. Eisberg and R. Resnick, Wiley and Sons
11. Engineering Physics, second edition, Sanjay Jain, G. Sahasrabudhe, University's Press (India) Pvt. Ltd. (2016)
12. D. J. Griffiths, Quantum mechanics, Prentice Hall of India Private Limited, New Delhi
13. L. I. Schiff, Quantum Mechanics, TMH Publications
14. Advanced Engineering Materials - Dr. Sangeeta G. Itankar, Dr. Manjusha Dandekar, Dr. Tushar R. Shelke, Dr. Swati Fartode, Alliance & Co. ISBN 978-93-91322-12-0 (2023)
15. Applied Physics- Dr. Sangeeta G. Itankar, Dr. Manjusha Dandekar, Dr. Tushar R. Shelke, Dr. Swati Fartode, Alliance & Co. ISBN 978-93-91322-97-7 (2023)
16. David Halliday, Robert Resnick, Jearl Walker, Principles of Physics, 10<sup>th</sup> Edition, John Wiley and Sons (2017)
17. Advanced physics - Dr. Shruti Patle, Dr. (Mrs.) S.U. Bhonsule, Dr. Ashish N. Bodhaye, Dr. Manohar D. Mehare DNA Publication (2019)
18. Engineering Physics - Dr. N. S. Ugemuge, Dr. (Mrs.) S.U. Bhonsule and Dr. Shruti Patle DNA Publication (2019)

Essentials of Physics Lab	
Total Credits: 01	Subject Code : BCB2P06
Teaching Scheme :	Examination Scheme :
Lectures: 3 Hours/Week	Duration of University Exam : 03 Hrs.



Tutorials: 0 Hours/Week	College Assessment: 50 Marks
Practical: 02 Hours/Week	University Assessment:-- Marks

### List of Experiments

1. Introduction to quantum computers.
2. Energy gap of semiconductor /thermistor.
3. Parameter extraction from V-I characteristics of PN junction diode.
4. Parameter extraction from V-I characteristics of Zener diode.
5. Parameter extraction from V-I characteristics of PNP/NPN transistor in CB and CE mode.
6. V-I Characteristics of Tunnel diode.
7. V-I Characteristics of Light Emitting Diodes/ Determination of Plank's constant by using LEDs.
8. Study of Diode rectification.
9. Study of Hall Effect and determination of Hall Voltage of given sample.
10. Variation of Hall coefficient ( $R_H$ ) with temperature.
11. To study B-H curve and to find out the values of coercivity, retentivity and saturation magnetization of experimental material.
12. Determination of NA for optical fiber
13. Calibration of Time Base circuit of CRO and determination of AC , DC voltage & frequency of electrical signals using CRO.
14. To determine the number of lines per cm on a diffraction grating using LASER beam.
15. Virtual Lab: Experiment on the determination of the thickness of a thin foil using an air wedge arrangement.
16. Virtual Lab: Experiment on the determination of the refractive indices of the material corresponding to ordinary and extra - ordinary rays.

**Note:** Performance of at least **six** experiments is compulsory in a semester.

Python Programming	
Total Credits: 03	Subject Code : BCB2T07
Teaching Scheme :	Examination Scheme :
Lectures: 3 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks
	University Assessment:70 Marks

Course Objectives	
1	This course is aimed at offering the fundamental concepts of Python scripting language to the students. It starts with the basics of Python programming and deals with lists, dictionaries, functions, exceptions and files.
2	The objective of this course is to enable the students to develop the applications using the concepts of Python.

Course Outcomes	
After completion of syllabus, students would be able to	
1	Understand the basic terminology used in computer programming to write, compile and debug programs in Python programming language.
2	Use different data types to design programs involving decisions, loops, and functions.
3	Handle the exceptions which are raised during the execution of Python scripts.
4	Handle data using tuples and dictionaries
5	Implement files and classes in the Python programming environment.

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## SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I : INSTALLATION, DATA TYPES AND INPUT/OUTPUT:</b>			
Importance of Python, Installing Python in Windows & Ubuntu, Executing Python programs, Comments in Python, Internal working of Python, Python character set, Tokens, Python Core Data Types, The print () function, Assignment of values to variables, The input() function, The eval() function.	7		1
<b>UNIT II : OPERATORS AND CONTROL STATEMENTS:</b>			
Operators- Arithmetic Operators, Operator precedence and Associativity, Bitwise operator, The compound assignment operator; Decision statements- Boolean operators, Boolean Expressions and Relational operators, Decision making statements; Loop Control Statements-while loop, range() function, for loop; break statement, continue statement	7		2
<b>UNIT III : FUNCTIONS AND LISTS</b>			
Functions- Syntax and basics of a function, Use of a function, Parameters and arguments in a function, The local and global scope of a variable, The return statement, Recursive functions, The lambda function; Lists- Creating Lists, Accessing the elements of a List, List slicing, Python in-built functions for lists, List Comprehension, List Methods, Passing list to a function, Returning a list to function.	7		3
<b>UNIT IV : TUPLES, SETS AND DICTIONARIES</b>			
Tuples - Creating tuples, tuple() function, Inbuilt functions for tuples, Indexing and Slicing, Operations on tuples, Passing variable length arguments to tuples, Sort tuples, Traverse tuples from a list, The zip() function, The Inverse zip(*) function; Sets - Creating sets, The set in and not in operator, The Python Set Class, Set operations; Dictionaries - Basics of Dictionaries, Creating a Dictionary, Adding and replacing values, Retrieving values, Formatting dictionaries, Deleting items, Comparing two dictionaries, Methods of dictionary class, Traversing dictionaries, Nested dictionaries, Traversing nested dictionaries.	8		4
<b>UNIT V : FILES</b>			
File Handling-Opening a file, Writing Text, Closing files, Writing numbers to a file, Reading Text, Reading numbers from a file, Appending data, seek() function	7		5

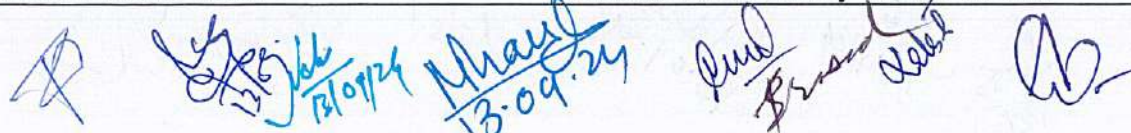
### Reference Books :

1. The complete reference PYTHON, Martin C Brown, McGraw Hill
2. Python Crash Course, 2nd Edition: A Hand: A Hands-On, Project-Based Introduction to Programming, Eric Matthes, No Starch Press

### URL:

1. <https://www.python.org/about/gettingstarted/>
2. <https://www.learnpython.org/>
3. <https://www.w3schools.com/python/>

<b>Python Programming Lab</b>	
Total Credits: 01	Subject Code : BCB2P07
Teaching Scheme :	Examination Scheme :
Lectures: 0 Hours/Week	Duration of University Exam : 03 Hrs.



Tutorials: 0 Hours/Week	College Assessment: 25 Marks
Practical: 02 Hours/Week	University Assessment: 25 Marks

### Python Programming Lab: Practical based on above

Computer Architecture & Organization (TH)	
Total Credits: 02 T	Subject Code : BCB2T08
Teaching Scheme :	Examination Scheme :
Lectures: 2 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks
Practical: 0 Hours/Week	University Assessment: 70 Marks

Course Objectives	
1	Aims to understand basic architecture of computers and data representation on it
2	Teach memory and IO operations and devices.

Course Outcomes	
After completion of syllabus, students would be able to	
1	Understand basic functional blocks of computer
2	Represent data using different methods
3	Understand memory read, write policies
4	Understand I/O and roles

### SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I :</b>			
Basic functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU - registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study - instruction sets of some common CPUs.	6		1
<b>UNIT II :</b>			
Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic - integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication - shift-and-add, Booth multiplier, carry save multiplier, etc. Division - non-restoring and restoring techniques, floating point arithmetic.	6		2
<b>UNIT III :</b>			
Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs block size, mapping functions, replacement algorithms, write policy	6		3
<b>UNIT IV :</b>			
Peripheral devices and their characteristics: Input-output subsystems, I/O transfers - program controlled, interrupt driven and DMA, privileged and	6		4

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Dr. S. K. Phary  
13/7/24

non-privileged instructions, software interrupts and exceptions. Programs and processes - role of interrupts in process state transitions.			
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### Reference Books :

- Computer Organisation, Hamacher, McGraw Hill
- Computer Organization and Design, 4th Ed, D. A. Patterson and J. L. Hennessy
- Computer Architecture, BerhoozParhami
- Microprocessor Architecture, Jean Loup Baer

### URL:

[https://onlinecourses.nptel.ac.in/noc20\\_cs64/preview](https://onlinecourses.nptel.ac.in/noc20_cs64/preview)

<https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/>

Linux and Shell Programming	
Total Credits: 02	Subject Code : BSE2P01
Teaching Scheme :	Examination Scheme :
Lectures: 0 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 50 Marks
Practical: 04 Hours/Week	University Assessment:50 Marks

- Learn Linux Commands required to execute below practical list
- Write a shell script to reverse a number
- Write a shell script to write your user name as banner & print it on the screen.
- Write a shell script called is dirs which just lists the directories in the current directory
- Write a shell script called see taking a file name, as arguments which uses is, if the file is a directory & more if file is otherwise
- Write a shell script, using command cp, which over writes a files or copies a file.
- Write a shell script that asks a user to type w word, in, then tells the user how long that word is.
- Write a shell script which appends line to the file. Both the file name and line name have to be specified to the script at the command line. Ensure that it runs the sh. shell script. Print the no of lines after you are done.
- Write a shell script that gives person's UID, tell you how many times that person has logged in.
- Write a shell script that takes UID as argument prints out the person's names, directory name, shell & group & other that person may belong to.
- Write a shell script that for mail merging. facility.

\*\*This is recommended list, to be changed every year by subject teacher

### IKS Courses

Consciousness Studies	
Total Credits: 02	Subject Code : BIK2T01A
Teaching Scheme :	Examination Scheme :
Lectures: 0 Hours/Week	Duration of University Exam : 03 Hrs.

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Tutorials: 0 Hours/Week	College Assessment: 30 Marks
Practical: 04 Hours/Week	University Assessment: 70 Marks

Course Objectives	
1	This course aims to focus on psychology, sensory processes and perception
2	Application of classical conditioning and understand behavior of mind.

Course Outcomes	
After completion of syllabus, students would be able to	
1	Analyze the basics of Psychology and its applications
2	Develop knowledge about the sensory processes and perception
3	Apply various theories of classical conditioning
4	Integrate the theories of memory and behaviour of mind












### SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I :</b>			
An introduction to Psychology Introduction to Psychology, Definition of psychology, history, methods in Psychology, Subfields of Psychology and its applications	6		1
<b>UNIT II :</b>			
Basic Cognitive Processes Sensory processes-general characteristics of senses, visual sense, auditory sense, other senses Perceptual organization-principles of perceptual organization, object perception and perceptual constancies, influences upon perception, extrasensory perception	6		2
<b>UNIT III :</b>			
Classical conditioning, theories about classical conditioning, Reinforcement and Punishment	6		3
<b>UNIT IV :</b>			
Theories about memory, brain and memory, long term memory, forgetting	6		4

### Reference Books:

1. Clifford T. Morgan, King, Weisz and Schopler, Introduction to Psychology, McGraw Hill Education (India) Private Limited
2. Hilgard, Atkinson and Atkinson(1977). Introduction to Psychology. Tata McGraw Hill
3. Kao H.S R.&Sinha D. (Eds)(1977). Asian perspectives on psychology. New Delhi: Sage

Preserving Art, Culture and Tradition	
Total Credits: 02	Subject Code : BIK2T01B
Teaching Scheme :	Examination Scheme :
Lectures: 0 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks

Approved by           

**Course Objectives**

1	To provide overview of Indian Knowledge System (IKS)
2	Sensitize the students to the contributions made by Indians in the field of philosophy, art and health.

**Course Outcomes****After completion of syllabus, students would be able to**

1	Interpret basics of Indian Knowledge system.
2	Integrate the teaching of Indian culture and civilization
3	Appreciate Indian artistic tradition.
4	Analyze Indian health and wellness system for healthy living

**SYLLABUS**

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I :</b>			
Introduction to Indian Knowledge System Introduction and overview of Indian Knowledge system, The Vedic Corpus -Vedas, Types of Vedas, Upavedas, Types of Upavedas	6		1
<b>UNIT II :</b>			
Indian Culture and Civilization Indian culture and Civilization: its characteristics, Difference between Culture and Civilization, Indus valley civilization, Vedic civilization.	6		2
<b>UNIT III :</b>			
Indian Artistic Tradition, Indian Artistic tradition: Chitrakala- Indian style painting (Madhubani, Warli, Phad, Kalamkari, Gond, Mandana), Nritya : Indian dance forms (Bharatnatyam, Kathak, Kathakali, Kuchipudi, Manipuri, Mohiniattam) Sangeet- Carnatic music & Hindustani music	6		3
<b>UNIT IV :</b>			
Health and Wellness, Well being: Mental & Physical, Dimensions of Wellness, Concept of healthy living in Ayurveda, Tri-doshas – Relationship to Health	6		4

**References:**

1. Introduction to Indian Knowledge System by Mahadevan, B, Bhat, VinayakRajat, NagendraPavana R.N., Prentice Hall India Pvt., Limited, 2022.
2. Indian knowledge Systems, KapilKapoor, Avadhesh Kumar Singh, D.K, Printworld.
3. Traditional Knowledge System in India by AmitJha, Atlantic Publishers, 2002
4. Exploring The Mysterious, By T.N. Dhar · Mittal Publications, 2004
5. Indian Art & Culture (E), By Anurag Kumar, Arihant Publication India Limited, 2016
6. A History of Indian Philosophy, Volume 2, By SurendranathDasgupta, Diamond Publishers, 2017
7. Sri Suresh Soni, Sources of our cultural heritage, PrabhatPrakashan, 2018.
8. A Beautiful Tree by Dharampal, RashtrottthanaSahitya, 2021

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Glimpses of ancient Science and Technology	
Total Credits: 02	Subject Code : BIK2T01C
Teaching Scheme :	Examination Scheme :
Lectures: 0 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks
Practical: 04 Hours/Week	University Assessment:--70 Marks

Course Objectives	
1	To provide the students with scientific foundation of Ancient Indian Knowledge System
2	To create awareness about scientific heritage of the ancient civilization

Course Outcomes	
After completion of syllabus, students would be able to	
1	To understand about great mathematicians and to help students to trace, identify, practice, and develop the significant Indian mathematics
2	To understand the concept of motion and its application in Indian ancient physics literature.
3	To understand the concepts of basic chemical & metallurgical process of ancient and medieval India.
4	

### SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
<b>UNIT I :</b>			
Mathematics in India: Introduction of inception of Mathematics from vedic periods. Great Mathematician and their contribution (e.g. Arytabhatta, Bhaskara, Brahmagupta, Ramanujan, Pingala, Bhaskara-II), Sulbhasutras (Pythagoras theorem), Square, Square root, Square root of imperfect Squares, Magic Squares, Value of Pi.	8		1
<b>UNIT II :</b>			
India: Vaisheshikadarshan Atomic theory & law of motion, theory of Panchmahabhoota, BrihathShathaka (divisions of the time, unit of distance), Bhaskaracharya (Introduction to theory of Gravity, Suryasiddhanta&Sidhantashriomani), Lilavati (Gurutvakashan Shakti).	8		2
<b>UNIT III :</b>			
Chemistry in India: Vatsyayana, Nagarjuna, Vagbhaṭa –building of Theras-Shala (laboratory), working arrangements of Ras-Shala, material and equipment, YaśodharaBhaṭṭa-process of distillation, apparatus. Metallurgy in India: Survarṇa(gold) and its different types, properties, Rajata(silver), Tamra(copper), Loha(iron), Jasta(zinc), Naga /Sisa(lead), Pittala(brass).	8		3

### Reference Books

1. R P Kulkarni, Glimpses of Indian Engineering and Technology (Ancient & Medieval period, MunshiramManoharlal Publishers Pvt. Ltd. 2018

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Wellness, traditional medicines and yoga	
Total Credits: 02	Subject Code : BIK2T01C
Teaching Scheme :	Examination Scheme :
Lectures: 0 Hours/Week	Duration of University Exam : 03 Hrs.
Tutorials: 0 Hours/Week	College Assessment: 30 Marks
Practical: 04 Hours/Week	University Assessment: 70 Marks

### Course Objective:

The course will enable engineering students to acquire the knowledge of richness of healthy lifestyle and strong heritage of yoga and Vedas in Indian traditional system.

### Course Outcomes:

On successful completion of the course, the students will be able to:

**CO1:** Understand the importance of a healthy lifestyle

**CO2:** Familiarize to manage stress and health consciousness about physical and mental health.

**CO3:** Appreciate the benefits of yoga and medicinal plant.

**CO4:** Identify the social changes in Indian society.

**Unit1:** Importance of health and wellness, Essential components of balanced diet for healthy living, Processed foods and unhealthy eating habits.

### Unit 2:

Body systems and common diseases, Sedentary lifestyle and its risk of disease, Stress, anxiety, and depression, Factors affecting mental health.

### Unit 3:

Importance and benefits of yoga, Purpose of yoga, traditional knowledge of medicinal plant, use of home available herbs and spices.

### Unit 4:

Vedas and its types, Social change in Indian society, Social stratification and class conflicts.

### Textbooks/References:

1. Sociology in India – Surendra Sharma, Rawat Publication.
2. Bradfird B, Strand and Others. Fitness Education Arizona GorsuchSeani; sbrick Publishers, 1997.
3. Scott K. Powers and Stephen L. Dodd. Total Fitness: Exercise, Nutrition and wellness, Boston: Allyn and Bacon, 1999.
4. RigvedaSamhita with Sayanabhasya, VaidikSamshodhanMandal, Pune
5. Riksuktashati, H. D. Velankar, BharatiyaVidyaBhavan, Mumbai

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