



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. (Computer Science and Business Systems –TCS)

SEMESTER-II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTC SBS201	BSC	Linear Algebra	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To introduce the fundamental properties of matrices, determinants, and standard matrix inversion techniques (Cramer's rule, Gaussian elimination, LU Decomposition) for solving systems of linear equations.
2. To impart a structural understanding of vector spaces, basis dimensions, linear combinations, and geometric vectors using orthogonalization frameworks like Gram-Schmidt and QR decomposition.
3. To expose students to spectral theory (eigenvalues/eigenvectors), linear transformations, specialized matrix forms (positive definite, Hermitian, unitary), and advanced factorizations (SVD, PCA) applied in intelligent computer applications

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Apply matrix elimination rules, determinant properties, vector transformations, and decomposition steps (LU, QR) to calculate solutions for linear algebraic systems ($Ax = b$).
- CO2** Analyze structural properties of linear systems by computing rank, vector space dimensions, orthogonal projections, eigenvalues, and structural transformations.
- CO3** Formulate and design data reduction and transformation configurations leveraging Principal Component Analysis (PCA), Singular Value Decomposition (SVD), and unitary operations to optimize multidimensional computer graphics, image transformations, and machine learning pipelines.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning

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ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction to Matrices and Determinants; Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.	6	ATL1 ATL3 ATL6
II	Vectors and linear combinations; Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices.	6	ATL1 ATL3 ATL6
III	Vector space; Dimension; Basis; Orthogonality; Projections; Gram-Schmidt orthogonalization and QR decomposition.	6	ATL1 ATL3 ATL6
IV	Eigen values and Eigenvectors; Positive definite matrices; Linear transformations; Hermitian and unitary matrices;	6	ATL1 ATL3 ATL6
V	Singular value decomposition and Principal component analysis (Non-credit and optional); Introduction to their applications in Image Processing and Machine Learning (one or two classes). Note: Assignments & tutorials covering the following: Vectors and linear combinations, Matrices, Linear transformations, Complete solution to $Ax =$	6	ATL1 ATL3 ATL6

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	b, Determinants, Eigen values and Eigenvectors.		
	Total Hours	30	

ADDITIONAL RESOURCES

A. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

- Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers.

Reference Books

- Advanced Engineering Mathematics, (Seventh Edition), Peter V. O'Neil, Cengage Learning.
- Advanced Engineering Mathematics, (Second Edition), Michael. D. Greenberg, Pearson.
- Introduction to linear algebra, (Fifth Edition), Gilbert Strang, Wellesley-Cambridge Press.
- Applied Mathematics (Vol. I & II), P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan.
- Digital Image Processing, R C Gonzalez and R E Woods, Pearson.

Suggestede- resources (Websites/e-books)

- <https://machinelearningmastery.com/introduction-matrices-machine-learning>

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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	2	1	1	-	-	-	1	1	-	3	3	2	1
CO2	3	3	2	2	2	-	-	-	1	1	-	3	3	3	1
CO3	3	3	3	3	3	1	1	1	2	2	1	3	3	3	2

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTC SBS202	BSC	Statistical Methods	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

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COURSE OBJECTIVES:

The student will have ability to:

1. To introduce the principles of random sampling, sample distribution characteristics, and point/interval estimation criteria (unbiasedness, consistency, maximum likelihood estimation).
2. To impart core knowledge of testing statistical hypotheses (Type I/II errors, Neyman-Pearson lemma) and executing diverse non-parametric distribution tests.
3. To expose students to linear statistical modeling configurations (multiple regression, ANOVA variants, collinearity Diagnostics) and stochastic time series modeling via stationary ARIMA engines

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Apply random sampling protocols, point estimation techniques, hypothesis test steps, and basic non-parametric tests to compute standard errors and validate data matrices.
- CO2** Analyze linear statistical relationships using multi-variable regression parameters, ANOVA interactions, model anomaly diagnostics (outliers, collinearity, autocorrelation), and order statistics.
- CO3** Formulate and design predictive forecasting structures and mathematical inference pathways using stationary ARIMA estimation models and multi-stage parametric or non-parametric frameworks to interpret structural business metrics.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams

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- ATL4 Flip Class
 ATL5 Seminar Presentation
 ATL6 Assignments
 ATL7 Poster
 ATL8 Oral Viva-voce examination
 ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Sampling Techniques: Random sampling. Sampling from finite and infinite populations. Estimates and standard error (sampling with replacement and sampling without replacement), Sampling distribution of sample mean, stratified random sampling.	6	ATL1 ATL3 ATL6
II	Linear Statistical Models: Scatter diagram. Linear regression and correlation. Least squares method. Rank correlation. Standard multiple regression models with emphasis on detection of collinearity, outliers, non-normality and autocorrelation, Validation of model assumptions. Multiple correlation, Analysis of variance (one way, two way with as well as without interaction).	6	ATL1 ATL3 ATL6
III	Estimation: Point estimation, criteria for good estimates (un-biasedness, consistency), Methods of estimation including maximum likelihood estimation.	6	ATL1 ATL3 ATL6
IV	Test of hypothesis: Concept & formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing.	6	ATL1 ATL3 ATL6
V	Non-parametric Inference: Comparison with parametric inference, Use of order statistics. Sign test, Wilcoxon signed rank test, Mann-Whitney test,	6	ATL1 ATL6

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	Run test, Kolmogorov-Smirnov test. Spearman's and Kendall's test. Basics of Time Series Analysis & Forecasting: Stationary, ARIMA Models: Identification, Estimation and Forecasting.		
	Total Hours	30	

ADDITIONAL RESOURCES

A. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

- Probability and Statistics for Engineers (4th Edition), I.R. Miller, J.E. Freund and R. Johnson.
- Fundamentals of Statistics (Vol. I & Vol. II), A. Goon, M. Gupta and B. Dasgupta.

Reference Books

- The Analysis of Time Series: An Introduction, Chris Chatfield.
- Introduction to Linear Regression Analysis, D.C. Montgomery & E. Peck.
- Introduction to the Theory of Statistics, A.M. Mood, F.A. Graybill & D.C. Boes.
- Applied Regression Analysis, N. Draper & H. Smith.
- Hands-on Programming with R, - Garrett Grolmund.
- R for Everyone: Advanced Analytics and Graphics, Jared P. Lander.

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcome s	Correlation with POs												Correlation with PSOs		
	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	PSO	PSO	PSO

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	1	2	3	4	5	6	7	8	9	0	1	2	1	2	3
CO1	3	2	1	2	1	-	-	-	1	1	-	3	2	2	1
CO2	3	3	2	3	2	1	-	-	1	1	-	3	2	3	1
CO3	3	3	3	3	3	1	1	1	2	2	2	3	3	3	2

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BTC SBS203	ESC	Object Oriented Programming	Max	60	20	20	30	20	2	1	2	4
			Min	24	16		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To explain abstract data types, classes and different types of objects.
2. To distinguish among types of relationships between classes and express the associations diagrammatically.
3. To analyze the public, protected and private modes of inheriting the classes.
4. To demonstrate the overloading of functions and operators to grant them a different meaning.
5. To formulate programs using the concepts of object oriented programming languages.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Identify and describe the components of object-oriented technology and justify their relevance.
- CO2** Classify and model the relationships/associations that exist between classes and objects.
- CO3** Perform experiments on inheritance by implementing code reusability and polymorphism by overloading the functions as well as operators.
- CO4** Develop programs for real world scenarios using the object oriented approach.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation
- ATL6** Assignments

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ATL7 Poster

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Procedural programming, An Overview of C: Types Operator and Expressions, Scope and Lifetime, Constants, Pointers, Arrays, and References, Control Flow, Functions and Program Structure, Namespaces, error handling, Input and Output (C-way), Library Functions (string, math, stdlib), Command line arguments, Pre-processor directive.	6	ATL1 ATL2 ATL6
II	Some difference between C and C++: Single line comments, Local variable declaration within function scope, function declaration, function overloading, stronger type checking, Reference variable, parameter passing – value vs reference, passing pointer by value or reference, #define constant vs const, Operator new and delete, the typecasting operator, Inline Functions in contrast to macro, default arguments.	6	ATL4 ATL8
III	The Fundamentals of Object Oriented Programming: Necessity for OOP, Data Hiding, Data Abstraction, Encapsulation, Procedural Abstraction, Class and Object. More extensions to C in C++ to provide OOP Facilities: Scope of Class and Scope Resolution Operator, Member Function of a Class, private, protected and public Access Specifier, this Keyword, Constructors and Destructors, friend class, error handling (exception).	6	ATL8
IV	Essentials of Object Oriented Programming: Operator overloading, Inheritance – Single and Multiple, Class Hierarchy, Pointers to Objects, Assignment of an Object to another Object, Polymorphism through dynamic binding, Virtual Functions, Overloading, overriding and hiding, Error Handling.	6	ATL2 ATL6
V	Generic Programming: Template concept, class template, function	6	ATL2

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	template, template specialization. Input and Output: Streams, Files, Library functions, formatted output. Object Oriented Design and Modelling: UML concept, Use case for requirement capturing, Class diagram, Activity diagram and Sequence Diagram for design, Corresponding C++ code from design.		
	Total Hours	30	

ADDITIONAL RESOURCES

A. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. The C++ Programming Language, Bjarne Stroustrup, Addison Wesley.
2. C++ and Object-Oriented Programming Paradigm, Debasish Jana, PHI Learning Pvt. Ltd.

Reference Books

1. Programming – Principles and Practice Using C++, Bjarne Stroustrup, Addison Wesley.
2. The Design and Evolution of C++, Bjarne Stroustrup, Addison Wesley.

LIST OF PRACTICAL

	Title	CO Mapping
1.	Parameter passing: passing parameter by value vs by reference, passing array as constant pointer.	CO1
2.	Function overloading: writing string operations like strcat and strncat, strcpy and strncpy as overloaded functions.	CO3
3.	Dynamically allocating space for a pointer depending on input and doing this repeatedly, depending on different inputs and finally de-allocating the pointer.	CO1
4.	Define class complex with all possible operations: constructor, destructor, copy constructor, assignment operator with the data members stored as pointer to integers.	CO1

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Shri Vaishnav Institute of Information Technology
 Choice Based Credit System (CBCS) in the light of NEP-2020
 B.Tech. (Computer Science and Business Systems –TCS)
 SEMESTER-II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSBS203	ESC	Object Oriented Programming	Max	60	20	20	30	20	2	1	2	4
			Min	24	16		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

5.	Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators.	CO1
6.	Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators.	CO1
7.	Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators.	CO2
8.	Define class stack, queue, linked-list, array, set using some data-type (int) with data members kept as private and functions kept in both protected and public sections.	CO1
9.	Define class complex with all possible operators: constructor, destructor, copy constructor, assignment operator and operators >, <, >=, <=, ==, ++ (pre and post), +, +=, (), with the data members stored as pointer to integers.	CO3
10.	Define class vector of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, ().	CO3
11.	Define class matrix of integers with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, ().	CO3
12.	Define class matrix of integers using vector, with all possible operations like constructor, destructor, copy constructor and assignment operators>, <, >=, <=, ==, ++ (pre and post), +, +=, ().	CO3
13.	Define stack and queue inherited from array class, with standard functions and operators.	CO3
14.	Define a class called 'array' with data type passed as template type with constructor, destructor, copy constructor and assignment operators and index operator.	CO1
15.	Define template functions for compare and use it in the algorithms like bubble sort, insertion sort, merge sort.	CO1
16.	Formatted input-output examples.	CO1
17.	Input manipulators.	CO1
18.	Overriding operators <<, >>.	CO3
19.	Define class model for complex number, student class, book class and show it using UML diagram as well as concrete class.	CO2
20.	Show behavioural modeling through sequence diagram and activity diagram for workflow in a typical log-in, log-out situation.	CO4

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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	2	1	2	-	-	-	1	1	-	3	3	2	1
CO2	3	3	3	2	3	1	-	-	2	2	-	3	3	2	1
CO3	3	3	3	3	3	-	-	-	2	1	1	3	3	2	2
CO4	3	3	3	3	3	2	1	1	3	2	2	3	3	3	2

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SEMESTER-II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTC SBS204	ESC	Principles of Electronics	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		15	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To introduce the fundamental physics of P-N junctions, BJT/FET structures, energy band transformations, and operational biasing regimes.
2. To impart core engineering knowledge for analyzing diode networks, power rectifiers, and the multi-configuration characteristic behaviors of bipolar and field-effect transistors.
3. To expose students to operational amplifier configurations (mathematical analog operations) and basic digital electronic building blocks like logic gates, multiplexers, and sequential counter modules

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Apply basic semiconductor laws, diode piecewise linear models, and logic switching rules to compute operating points, rectifier parameters, and logic outputs.
- CO2** Analyze transconductance characteristics, energy band transitions, operational amplifier configurations (Inverting, Non-Inverting, PID), and timing behaviors in sequential digital registers.
- CO3** Formulate and design simple electronic systems leveraging voltage regulators, multi-stage transistor configurations (BJT/FET), analog processing blocks, and combinational/sequential digital circuits to meet specified performance parameters.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams

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Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introductory idea of semiconductors: Formation of P-N junction, energy band diagram, built in-potential, forward and reverse biased P-N junction, formation of depletion zone. Formation of PNP / NPN junctions, energy band diagram.	6	ATL1 ATL3 ATL6 ATL8
II	Diodes and Diode Circuits: V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance and Varactor diode. Simple diode circuits, load line, linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation.	6	ATL1 ATL3 ATL6 ATL8
III	Transistors and transistor circuits: Transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles.	6	ATL1 ATL3 ATL6 ATL8
IV	Operational amplifier basics: Introduction to integrated circuits, operational amplifier and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Proportional,	6	ATL1 ATL3 ATL6

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	Integral, Derivative circuits.		ATL8
V	Basic ideas of Digital electronics: Basic idea of switching circuit, Realization of Logic gates, multiplexers and demultiplexers, Flip flop, Registers and Counters.	6	ATL1 ATL6 ATL8
	Total Hours	30	

A. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Microelectronics Circuits, Adel S. Sedra and Kenneth Carless Smith, Oxford University Press.
2. Millman's Integrated Electronics, Jacob Millman, Christos Halkias, Chetan Parikh, McGraw Hill Education.

Reference Books

1. Digital Logic & Computer Design, M. Morris Mano, Pearson.
2. Electronic Devices and Circuit Theory, Robert L. Boylestad, Louis Nashelsky.
3. Solid State Electronic Devices, 6th Edition, Ben Streetman, Sanjay Banerjee.
4. Electronic Principle, Albert Paul Malvino.
5. Electronics Circuits: Discrete & Integrated, D Schilling C Belove T Apelewicz R Saccardi.
6. Microelectronics, Jacob Millman, Arvin Grabel.
7. Electronics Devices & Circuits, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj.
8. Electronic Devices & Circuit Theory, 11th Edition, Robert L. Boylestad, Louis Nashelsky.

LIST OF PRACTICAL

	Title	CO Mapping
1.	Study of V-I characteristics of a P-N Junction Diode and Zener Diode.	CO1

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				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCBSBS204	ESC	Principles of Electronics	Max	60	20	20	30	20	3	0	2	4
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2.	Design and analysis of Half-Wave and Full-Wave Rectifiers (with and without filter circuits).	CO3
3.	Study of Input and Output characteristics of a Bipolar Junction Transistor (BJT) in Common Emitter (CE) configuration	CO2
4.	Study of Drain and Transfer characteristics of a Field Effect Transistor (JFET/MOSFET).	CO2
5.	Implementation of Inverting and Non-Inverting Amplifiers using Operational Amplifier (Op-Amp 741).	CO2
6.	Design of Op-Amp Mathematical Circuits: Proportional, Integral, and Derivative (PID) blocks.	CO3
7.	Verification of truth tables of basic Logic Gates and realization of Universal Gates.	CO1
8.	Design and realization of Combinational Circuits: Multiplexers (MUX) and Demultiplexers (DEMUX).	CO3
9.	Study and implementation of Sequential Circuits: Flip-Flops, Shift Registers, and Counters	CO3

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	2	1	1	-	-	-	1	1	-	3	2	2	1
CO2	3	3	2	2	2	1	-	-	1	1	-	3	2	3	1
CO3	3	3	3	3	3	1	1	1	2	2	1	3	3	3	2

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				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTC SBS205	HSSM	Fundamentals of Economics	Max	60	20	20	0	0	2	0	0	2
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To introduce core microeconomic paradigms including demand/supply dynamics, elasticity behaviors, household choice constraints, and market structure variations (perfect competition, monopoly, and monopolistic markets).
2. To impart a clear structural understanding of consumer optimization rules, short-run/long-run production economics, and cost minimization frameworks using isoquant tracking
3. To expose students to macroeconomic aggregates (GDP, NDP, GNP, NNP), equilibrium income determination via the simple Keynesian multiplier, and the operational intersection of commodity and money markets through the IS-LM framework.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Apply laws of demand, supply elasticity, budget lines, and cost curve metrics to solve structural pricing, taxation, and output problems under varying competitive frameworks.
- CO2** Analyze consumer choice behavior using income/substitution effects, cost minimization configurations, and macroeconomic market adjustments through monetary and fiscal policies.
- CO3** Formulate integrated business and system optimization frameworks leveraging consumer/producer surpluses, market equilibrium adjustments, production functions, and macroeconomic IS-LM models to evaluate fluctuating business cycles.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz

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			Marks	THEORY			PRACTICAL					
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BTCBSBS205	HSSM	Fundamentals of Economics	Max	60	20	20	0	0	2	0	0	2
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Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL2 Activity Based Learning

ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Microeconomics: Principles of Demand and Supply - Supply Curves of Firms - Elasticity of Supply; Demand Curves of Households - Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve); Welfare Analysis - Consumers' and Producers' Surplus - Price Ceilings and Price Floors; Consumer Behaviour - Axioms of Choice - Budget Constraints and Indifference Curves; Consumer's Equilibrium - Effects of a Price Change, Income and Substitution Effects - Derivation of a Demand Curve; Applications - Tax and Subsidies - Intertemporal Consumption - Suppliers' Income Effect; Theory of Production - Production Function and Iso-quants - Cost Minimization; Cost Curves - Total, Average and Marginal Costs - Long Run and Short Run Costs; Equilibrium of a Firm Under Perfect Competition; Monopoly and Monopolistic Competition.	15	ATL1 ATL2 ATL3 ATL6
II	Macroeconomics: National Income and its Components - GNP, NNP, GDP, NDP; Consumption Function; Investment; Simple Keynesian Model of Income Determination and the Keynesian Multiplier; Government Sector -	15	ATL1 ATL2 ATL3

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BTCSBS205	HSSM	Fundamentals of Economics	Max	60	20	20	0	0	2	0	0	2
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	Taxes and Subsidies; External Sector - Exports and Imports; Money - Definitions; Demand for Money - Transactionary and Speculative Demand; Supply of Money - Bank's Credit Creation Multiplier; Integrating Money and Commodity Markets - IS, LM Model; Business Cycles and Stabilization - Monetary and Fiscal Policy - Central Bank and the Government; The Classical Paradigm - Price and Wage Rigidities - Voluntary and Involuntary Unemployment.		ATL6
	Total Hours	30	

ADDITIONAL RESOURCES

A. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Microeconomics, Pindyck, Robert S., and Daniel L. Rubinfeld.
2. Macroeconomics, Dornbusch, Fischer and Startz.

Reference Books

1. Economics, Paul Anthony Samuelson, William D. Nordhaus.
2. Intermediate Microeconomics: A Modern Approach, Hal R. Varian.
3. Principles of Macroeconomics, N. Gregory Mankiw.

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CO3	3	3	3	3	3	3	2	2	2	2	3	3	2	3	3

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			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSBS206	HSSM (VEC)	Universal Human Values	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature
Thus, this course is intended to provide a much needed orientation input in value education to the young enquiring minds.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** The methodology of this course is exploration and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
- CO2** It is free from any dogma or value prescriptions.
- CO3** It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.
- CO4** This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution.
- CO5** This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching

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				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCBSBS206	HSSM (VEC)	Universal Human Values	Max	60	20	20	0	0	3	0	0	3
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T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1 Quiz
- ATL2 Activity Based Learning
- ATL3 Midterm Exams
- ATL4 Flip Class
- ATL5 Seminar Presentation
- ATL6 Assignments
- ATL7 Poster
- ATL8 Oral Viva-voce examination
- ATL9 Industrial Visit Report

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Course Introduction - Need, Basic Guidelines, Content and Process for Value Education 1. Understanding the need, basic guidelines, content and process for Value Education. 2. Self Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration. 3. Continuous Happiness and Prosperity- A look at basic Human Aspirations. 4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. 5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario.	6	ATL1 ATL2 ATL6

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	6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.		
II	Understanding Harmony in the Human Being - Harmony in Myself! 7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. 8. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. 9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). 10. Understanding the characteristics and activities of 'I' and harmony in 'I'. 11. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. 12. Programs to ensure Sanyam and Swasthya - Practice Exercises and Case Studies will be taken up in Practice Sessions.	6	ATL4 ATL8
III	Understanding Harmony in the Family and Society- Harmony in Human Human Relationship 13. Understanding Harmony in the family – the basic unit of human interaction. 14. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. 15. Understanding the meaning of Vishwas; Difference between intention and competence. 16. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. 17. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals.	6	ATL8

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	18. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family! - Practice Exercises and Case Studies will be taken up in Practice Sessions.		
IV	Understanding Harmony in the Nature and Existence - Whole existence as Co-existence 19. Understanding the harmony in the Nature. 20. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. 21. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. 22. Holistic perception of harmony at all levels of existence - Practice Exercises and Case Studies will be taken up in Practice Sessions.	6	ATL2 ATL6
V	Implications of the above Holistic Understanding of Harmony on Professional Ethics 23. Natural acceptance of human values. 24. Definitiveness of Ethical Human Conduct. 25. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. 26. Competence in professional ethics: a) Ability to utilize the professional competence for augmenting universal human order. b) Ability to identify the scope and characteristics of people-friendly and ecofriendly production systems. c) Ability to identify and develop appropriate technologies and management patterns for above production systems. 27. Case studies of typical holistic technologies, management models and production systems. 28. Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers.	6	ATL2

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	b) At the level of society: as mutually enriching institutions and organizations.		
	Total Hours	30	

ADDITIONAL RESOURCES

A. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. The text book R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2.
2. The teacher's manual R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi, 2010.

Reference Books

1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
2. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.
3. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991.
4. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA.
5. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, limits to Growth, Club of Rome's Report, Universe Books.
6. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
7. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
8. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
9. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
10. A set of DVDs containing
 - Video of Teachers' Orientation Program.
 - PPTs of Lectures and Practice Sessions.
 - Audio-visual material for use in the practice sessions.

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Suggested resources (Websites/e-books)

1. Value Education websites, <http://uhv.ac.in>, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story
6. Gandhi A., Right Here Right Now, Cyclewala Productions

LIST OF PRACTICAL

	Title	CO Mapping
1.	UNIT 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education PS 1: Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcomings in your life? Observe and analyze them. Expected outcome: the students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course. PS 2: Now-a-days, there is a lot of voice about many techno-genic maladies such as energy and natural resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. – all these seem to be man-made problems threatening the survival of life on Earth – What is the root cause of these maladies & what is the way out in your opinion? On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression & suicidal attempts, etc – what do you think, is the root cause of these threats to human happiness and peace – what could be the way out in your opinion? Expected outcome: the students start finding that technical education without study	CO1

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	of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of all problems and the sustained solution could emerge only through understanding of human values and value based living. Any solution brought out through fear, temptation or dogma will not be sustainable. PS 3: 1. Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of i) What is Naturally Acceptable to you in relationship- Feeling of respect or disrespect? ii) What is Naturally Acceptable to you – to nurture or to exploit others? Is your living the same as your natural acceptance or different? 2. Out of the three basic requirements for fulfilment of your aspirations- right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine. Expected outcome: 1. The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify right or wrong, and referring to any external source like text or instrument or any other person cannot enable them to verify with authenticity; it will only develop assumptions. 2. The students are able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony. 3. The students are able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facilities in most of the cases, while they have given higher priority to earning of physical facilities in their life ignoring relationships and not being aware that right understanding is the most important requirement for any human being.	
2.	UNIT 2: Understanding Harmony in the Human Being - Harmony in Myself!	CO1

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PS 4: List down all your desires. Observe whether the desire is related to Self (I) or Body. If it appears to be related to both, see which part of it is related to Self (I) and which part is related to Body. Expected outcome: the students are able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to 'I' and 'Body' distinctly. If any desire appears related to both, they are able to see that the feeling is related to I while the physical facility is related to the body. They are also able to see that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centered on the fulfilment of the needs of the body assuming that it will meet the needs of 'I' too. PS 5: 1. a. Observe that any physical facility you use, follows the given sequence with time : Necessary & tasteful → unnecessary & tasteful → unnecessary & tasteless → intolerable b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If naturally acceptable, you want it continuously and if not acceptable, you do not want it any moment! 2. List down all your activities. Observe whether the activity is of 'I' or of Body or with the participation of both 'I' and Body. 3. Observe the activities within 'I'. Identify the object of your attention for different moments (over a period of say 5 to 10 minutes) and draw a line diagram connecting these points. Try to observe the link between any two nodes. Expected outcome: 1. The students are able to see that all physical facilities they use are required for a limited time in a limited quantity. Also they are able to see that in case of feelings, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable even for a single moment. 2. the students are able to see that activities like understanding, desire, thought and selection are the activities of 'I' only, the activities like breathing, palpitation of different parts of the body are fully the activities of the body with the acceptance of	
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	'I' while the activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs etc. are such activities that require the participation of both 'I' and body. 3. The students become aware of their activities of 'I' and start finding their focus of attention at different moments. Also they are able to see that most of their desires are coming from outside (through preconditioning or sensation) and are not based on their natural acceptance. PS 6: 1. Chalk out programs to ensure that you are responsible to your body- for the nurturing, protection and right utilisation of the body. 2. Find out the plants and shrubs growing in and around your campus. Find out their use for curing different diseases. Expected outcome: The students are able to list down activities related to proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing different diseases.	
3.	UNIT 3: Understanding Harmony in the Family and Society- Harmony in Human Human Relationship PS 7: Form small groups in the class and in that group initiate dialogue and ask the eight questions related to trust. The eight questions are : 1a. Do I want to make myself happy? 2a. Do I want to make the other happy? 3a. Does the other want to make him happy? 4a. Does the other want to make me happy? What is the answer? Intention (Natural Acceptance) 1b. Am I able to make myself always happy? 2b. Am I able to make the other always happy? 3b. Is the other able to make him always happy? 4b. Is the other able to make me always happy?	CO1

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What is the answer? Competence Let each student answer the questions for himself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate your intention & competence as well as the others' intention & competence. Expected outcome: The students are able to see that the first four questions are related to our Natural Acceptance i.e. Intention and the next four to our Competence. They are able to note that the intention is always correct, only competence is lacking! We generally evaluate ourselves on the basis of our intention and others on the basis of their competence! We seldom look at our competence and others' intention as a result we conclude that I am a good person and other is a bad person. PS 8: 1. Observe on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasions you are disrespecting by way of under evaluation, over-evaluation or otherwise evaluation. 2. Also observe whether you're feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs. Expected outcome: The students are able to see that respect is right evaluation, and only right evaluation leads to fulfilment in relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect), like gender biasness, generation gap, caste conflicts, class struggle, dominations through power play, communal violence, clash of isms, and so on so forth. All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs. PS 9: 1. Write a note in the form of story, poem, skit, essay, narration, dialogue to educate a child. Evaluate it in a group. 2. Develop three chapters to introduce 'social science- its need, scope and content' in the primary education of children	
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Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

	Expected outcome: The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.	
4.	Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Co-existence PS 10: List down units (things) around you. Classify them in four orders. Observe and explain the mutual fulfilment of each unit with other orders. Expected outcome: The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to other orders today and need to take appropriate steps to ensure right participation(in terms of nurturing, protection and right utilization) in the nature. PS 11: 1. Make a chart for the whole existence. List down different courses of studies and relate them to different units or levels in the existence. 2. Choose any one subject being taught today. Evaluate it and suggest suitable modifications to make it appropriate and holistic. Expected outcome: The students feel confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are able to make out how these courses can be made appropriate and holistic.	CO2
5.	UNIT 5: Implications of the above Holistic Understanding of Harmony at all Levels of Existence	CO2

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SEMESTER-II (2026-30)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSBS206	HSSM (VEC)	Universal Human Values	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

PS 12: Choose any two current problems of different kind in the society and suggest how they can be solved on the basis of natural acceptance of human values. Suggest steps you will take in present conditions. Expected outcome: The students are able to present sustainable solutions to the problems in society and nature. They are also able to see that these solutions are practicable and draw roadmaps to achieve them. PS 13: 1. Suggest ways in which you can use your knowledge of Technology/Engineering/ Management for universal human order, from your family to the world family. 2. Suggest one format of humanistic constitution at the level of nation from your side. Expected outcome: The students are able to grasp the right utilization of their knowledge in their streams of Technology/Engineering/ Management to ensure mutually enriching and recyclable productions systems. PS 14: The course is going to be over now. Evaluate your state before and after the course in terms of a. Thought b. Behavior and c. Work d. Realization Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it. Expected outcome: The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for a happy and prosperous society.	
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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCSBS206	HSSM (VEC)	Universal Human Values	Max	60	20	20	0	0	3	0	0	3
			Min	24	16		0	0				

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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	3	2	2	1	1	-	3	-	-	-
CO2	-	-	-	-	-	2	1	3	2	-	-	2	-	-	-
CO3	-	-	-	-	-	3	3	3	2	2	-	3	-	-	-
CO4	-	-	-	-	-	2	1	2	3	3	1	3	-	-	-
CO5	-	-	-	-	-	3	2	3	2	2	-	3	-	-	-

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			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCBSBS207	UG	English Language Course	0	0	0	30	20	2	0	0	2

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Leadership Oriented Learning(LOL)	
Nature of Course	
Behavioural	
Prerequisites	
Basic Knowledge of English(verbal and written) Completion of all units from Semester 1	
Course Objectives:	
1	Develop effective writing, reading, presentation and group discussion skills.
2	Help students identify personality traits and evolve as a better team player.
3	Introduce them to key concepts of a) Morality b) Behaviour and beliefs c) Diversity& Inclusion
Course Outcomes:	
Upon completion of the course, students shall have ability to:	
C2.6.1	Understand tools of structured written communication [U]

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BTC SBS207	UG	English Language Course	60	20	20	0	0	2	0	0	2

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C2.6.2	Use tools of structured written communication	[AP]
C2.6.3	Use electronic/social media to share concepts and ideas	[AP]
C2.6.4	Develop materials to create an identity for an organization dedicated to a social cause	[C]
C2.6.5	Understand the basics of presentation	[U]
C2.6.6	Apply effective techniques to make presentations.	[AP]
C2.6.7	Assess presentations based on given criteria	[E]
C2.6.8	Understand tools for quick reading.	[U]
C2.6.9	Apply the basic concept of speed reading, skimming and scanning.	[AP]
C2.6.10	Identify individual personality types and role in a team.	[U]
C2.6.11	Recognize the concepts of outward behavior and internal behaviour	[AP]
C2.6.12	Understand the basic concepts of Morality and Diversity	[U]
C2.6.13	Create communication material to share concepts and ideas	[C]
C2.6.14	Argue on a topic based on morality and diversity	[E]
C2.6.15	Articulate opinions on a topic with the objective of influencing others	[C]
C2.6.16	Organize an event to generate awareness and get support for cause	[C]

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Course Contents:

- Identification of common errors in written communication and ways of rectification
- Understanding speed reading techniques–Skimming and Scanning
- Application of reading and writing skills
- Analyzing personality traits and team player style
- Understanding the concepts of Morality, Diversity and Inclusion
- Application of these concepts
- Creation of communication material
- Experiencing diversity and organizing events to support inclusion
- Assignment–Assimilation of concepts and present them effectively

Total Hours:	61
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Text Books:

	There are no prescribed texts for Semester2–there will be hand outstand reference links shared.
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Reference Books:

1	Guiding Souls: Dialog use on the purpose of life; Dr.A.P.J Abdul Kalam; Publishing Year-2005;Co-author—Arun Tiwari
2	The Family and the Nation; Dr.A.P.J Abdul Kalam; Publishing year:2015;Co-

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	author: Acharya Mahapragya
3	The Scientific India: A twenty First Century Guide to the World around Us; Dr.A.P.J Abdul Kalam; Publishing year: 2011; Co-author- Y.S. Rajan
4	Forge Your Future: Candid, Forthright, Inspiring; Dr. A.P.J Abdul Kalam; Publishing year: 2014
5	Abundance: The Future is Better Than You Think; Peter H. Diamonds and Steven Kotler; Published: 21 Feb, 2012; Publisher: Free Press
6	Start With Why: How Great Leaders Inspire Every one to Take Action; Simon Sinek; Published : 6 October 2011; Publisher: Penguin
7	Advertising & IMC: Principles and Practice; Sandra Moriarty, Nancy D. Mitchell, William D. Wells; Published: 15 June 2016; Publisher: Pearson Education India
Web References:	
1	ETHICS FUNDAMENTALS AND APPROACHES TO ETHICS https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf
2	A Framework for Making Ethical Decisions https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions
3	Five Basic Approaches to Ethical Decision- https://www.pbs.org/wnet/religionandethics/files/2008/09/five_sources.pdf
Online Resources:	
1	https://youtu.be/CsaTslhSDI
2	https://m.youtube.com/watch?feature=youtu.be&v=I1KvV8_T95M

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3	https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y
4	https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be
5	https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu.be

Assessment Methods & Levels (based on Bloom's Taxonomy)

For motive assessment (Max.Marks:20)

Course Outcome	Bloom's Level	Assessment Component	Marks
C1.6.1	Understand	Immersion(interview)	5
C1.6.2	Understand	Create CV	4
C1.6.3	Apply	Group Assignment-Forman NGO	5
C1.6.4	Understand	Group activities	3
C1.6.5	Create	Create and present a street play to articulate and Amplify the social cause.	3

Summative Assessment based on End Semester Project

Bloom's Level		
Understand	Written Assessment, project and group discussion	50
Apply		
Analyze		

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Lesson Plan

Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
1			Icebreaker.1) Participate in 'Join Hands Movement'. Individual identification of social issues.2)Each Individual chooses one particular social issue which they would like to address.3) Class to be divided in teams for the entire semester. All activities to be done in teams and the grades, credit points will be captured in the leader board in the class room.4) Theory to introduce the participant Slam book to be used for capturing individual Learning points and observations.	Group discussion, Practical	60 Minutes
1	Understand tools of structured written communication	Understand	Research on the social cause each group will work for.	Practical(practical)	90 Minutes

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BTCBS207	UG	English Language Course	60	20	20	0	0	2	0	0	2

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
1	Use tools of structured written communication	Understand	Class discussion- Good and Bad Writing. Common errors, punctuation rules, use of words.	PPT, Theory and Practical	90 Minutes
1			Group Practical –As a group, they will work on the social Issue identified by them.	Formative evaluation	
			Research, read and generate a report based on the findings. (Apply the learning and recap From the session)		70 Minutes
1	Create communication material to share concepts and ideas	Create	Practical: Plan and design an E Magazine. Apply and assimilate the knowledge gathered from Sem-1 till date. Share objective & guideline. All members to contribute an article to the magazine, trainer to evaluate the content.	Practical(Practical)	120 Minutes

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BTC SBS207	UG	English Language Course	60	20	20	0	0	2	0	0	2

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
1	Understand tools for Lucid writing	Understand	Lucid Writing: Encourage the students to go through the links given about Catherine Morris and Joanie McMahon's writing techniques.	Theory and Discussion	30mins
1	Create communication material to share concepts and ideas	Create	Create the magazine	Practical(Lab)	90 Minutes
1		Understand	SATORI – Participants share the personal take away acquired from GD, writing and reading skills activities captured in their handbook. Share the most important learning points from the activities done so far and how that learning has brought a change.	Theory/Discussion	60 Minutes

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
1	Use electronic/social media to share concepts and ideas	Apply	Launching an E Magazine.	Practical(Lab)	120 Minutes
1			Quiz Time	Summative Evaluation for Unit	60 Minutes
Unit2					
2	Develop materials to create an identity for an organization dedicated to a Social cause	Create	Each group will for man NGO. Create Vision, Mission, Value statement, tag line and Design a logo.	Practical and Practical	90 Minutes
2	Understand the basics of presentation	Understand	Introduction to basic presentation skills & ORAI app	Theory and video	60 Minutes
2	Apply effective techniques to make presentations.	Apply	Groups to present their NGOs. Apply the learning gathered from session 2. Presentation to be recorded by the groups. Feedback from the audience/ Professor	Formative evaluation	60 Minutes

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2	Assess presentation based on given criteria	Evaluate	Group to come back and share their findings from the recording. Post work-individual write up to be written and evaluated for the E- magazine	Sharing of learning, written Practical and formative evaluation	60 Minutes & 60 Minutes
2	Create communication material to	Create	Prepare and publish the Second episode of the E Magazine.		
	Share concepts and ideas Use electronic/social media to share concepts and ideas	Apply		Practical(Lab)	120 minutes
2	Understand the tools for speed reading. Apply the basic concepts of speed reading, skimming and scanning.	Understand Apply	Speed Reading session: Introduction to skimming and scanning; practice the same.	Theory and Practical	30 Minutes
2		Understand	SATORI – Join the dots- Participants to connect their learning gathered from AIP Unit-2 with their existing curriculum	Share the most important learning points	60 Minutes
2			Quiz Time	Summative Evaluation for Unit	60 Minutes

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BTC SBS207	UG	English Language Course	60	20	20	0	0	2	0	0	2

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Unit3					
3	Develop materials to create an identity for an organization dedicated to a social cause	Create	Ad campaign- Brain storming session- Students to discuss and explore the means of articulating and amplifying the	Discussion	60 Minutes
			Social issue their NGOs are working for.		
3	Create communication material to share concepts and ideas.	Create	Design a skit- a) write the script articulating the message of their respective NGOs. Read out the script.(Skit time- 5 minutes). Feedback of Theory.	Practical based learning. Formative evaluation by Theory	a) 30 Minutes b) 60 Minutes
3	Use electronic/social media to share concepts and ideas	Apply	Promote the play through a social media and gather your audience. Enact the play. Capture the numbers of likes and reviews. Theory to assign grades to individual team.	Practical based learning Formative Evaluation	Lab Time:90 Minutes Class Time:60 Minutes
3	Identify individual personality types and role in a team.	Understand	(1) Theory to find out from the participants their views, observations and experiences of working in a team(2)Intro of Dr. Meredith Belbin and his research on team work and how individuals contribute.	Discussion and Theory	60 Minutes

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Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech (Computer Science & Business System- TCS)

SEMESTER-II (2025-2029)

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
3	Identify individual personality types and role in a team.	Understand	Cont. (3) Belbin's 8 Team Roles and Lindgren's Big 5 personality traits.(4)Belbin's8 team player styles	Practical based learning followed by a presentation	40 Minutes
3	Identify individual personality	Understand			
	Types and role in a team.		(1)Team Falcon Practical to identify individual personality traits with Belbin's 8 team player styles	Practical based learning followed by a presentation.	(1&2) 40 Minutes
3	Recognize the concepts of outward behavior and internal behaviour	Understand	(2)Similar personality types to form groups (3) Groups present their traits.	Presentation	(3)60 minutes
3	Create communication material to share concepts and ideas. Use the electronic/social media to share concepts and ideas	Create Apply	Prepare and publish the third episode of the E Magazine.	Practical	60 Minutes

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
3		Understand Understand	SATORI – (join the dots with participants personal life) Participants share the personal take away acquired from working in teams, GD, learning about presentations, presenting their NGOs	Share the most important learning points from the activities done so far. Participants talk about the changes they perceive in themselves	60 Minutes
3			Quiz Time	Summative Evaluation for Unit	60 Minutes
Unit4					
	Understand the Basic concepts		Ten minutes of your time—a Short film on diversity. Play		
4	Of Morality and Diversity	Understand	The video (link to be attached in the FG)	Video & discussion	30 Minutes
4	Understand the basic concepts of Morality and Diversity	Understand	Discuss key take away of the film. Theory to connect the key take away of the film to the concept of empathy.	Practical	30 Minutes

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4	Understand the basic concepts of Morality and Diversity	Understand	Touch the target (Blindman)- Debriefing of the Practical. Film: "The fishandl' 'by Babak Habibifar"(1.37mins)	Practical and discussion	60 Minutes
4	Create communication material to share concepts.	Create	Groups to create story–10 minutes of a person's life affected by the social issue groups are working on. Narrate the story in first person. Feedbacks to be shared by the other groups.	Practical, sharing and Practical	120 Minutes
4	Understand the basic concepts of Morality and Diversity	Understand	Research on a book, incident or film based on the topic of your respective NGO	Research and written Practical	120 Minutes
4	Create communication material to share concepts.	Create	Write a review in a blog on the topics they are covering in their research. Theory will give grades to each team.	Written Practical and Formative Evaluation	60 Minutes
4	Understand the basic concepts of Morality and Diversity	Understand	Session on Diversity & Inclusion-Different forms of Diversity in our society.	PPT, Theory, discussion	60 Minutes

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
4	Create communication material to share concepts.	Create	Teams to video record interviews of people from diverse groups (Ask 5 questions). Share the recordings in FB	Practical	120 Minutes
4	Argue on a topic based on morality and diversity	Evaluate	Debate on the topic of diversity with an angle of ethics, morality and respect for individual (In the presence of an external moderator). Groups will be graded by the professor.	Practical and for motive evaluation	60 Minutes
4	Articulate opinions on a topic with the objective of influencing others	Create	Prepared speech- Every student will narrate the challenges faced by a member of a diverse group in 4 minutes (speech in first person). Theory to give feedback to each student.	Practical and formative Evaluation	90 Minutes
4	Understand the basic concepts of Morality and Diversity	Understand	Discussion on TCS values, Respect for Individual and Integrity.	PPT, Theory, Practical and discussion	60 Minutes

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Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
4	Create communication material to share concepts and ideas.	Create Apply	Prepare and publish the final episode of the E Magazine.	Practical	120 Minutes
	Use the electronic/social media to share concepts and ideas				
4		Understand	SATORI–Participants share the personal take away acquired from working in teams, GD, learning about presentations and understanding diversity inclusion.	Discussion	60 Minutes
4	Use tools of structured written communication	Apply	Revisit our resume Include your recent achievements in your resume.	Submit it to the Professor	Lab time-30 Minutes
4			Quiz Time	Summative Evaluation for Unit	60 Minutes

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4	Organize an event to generate awareness and get support for a cause	Create	Project- 1) Each team to look for an NGO/ social group in the city which is working on the issue their college group is supporting. 2) Spend a day with the NGO/ social group to understand exactly how they work and the challenges they face. 3) Render voluntary service to the group for one day 4) Invite the NGO/ social group to address their university students for couple of hours. Plan the entire event, decide				Field work: Formative Evaluation	7Hours
			Suitable venue in the university, gather audience, invite faculty members etc. (they need to get their plan ratified their professor). Outcome-- Host an interactive session with the NGO spokesperson 5) The groups to present their experience of a day with the NGO and inspire students to work for the cause.					

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TOTAL					61 hours
	Assessment	Understand	Written Assessment of 20 marks		
		Create	Project of 20 marks(E-Magazine4editions)		
		Analyze, Create	Focus Group Discussion 10 marks		

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B.Tech. (Computer Science & Business System- TCS)

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			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTC SBS208	CC	Co-curricular Courses (CC) (Rural Outreach Course)	0	0	0	0	50	0	0	2	1

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

The main objective of introducing this course is to sensitize students about the socio-cultural aspects of the rural areas parochial to their colleges. Students are expected to observe, investigate and learn about the following aspects of the rural region:

- Demographics, Literacy, Geographical parameters of the Village.
 - Schemes of government of India and State of Madhya Pradesh in operation in the villages.
 - Social/ Cultural aspects ranging from popular dance forms, music and customs of the concerned village.
- This course shall be done by the students in a self-study mode. Study methodology shall comprise of combining field visits, case studies, analyzing policy documents from different government departments, discussions with field officers, active NGO's and so on.
 - The faculty associated with the course shall evaluate the candidate and grade him.
 - For evaluation purpose, students are expected to submit a summary on the government schemes and policies for the socio-cultural development of the concerned village. This shall be followed by final submission of two case studies covering broad spectrum of socio-cultural issues ranging from life in slums, infant mortality, watershed management, portability of water, animal welfare etc. These case studies shall be submitted to the mentor for the final evaluation of the coursework.

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BTCBS209	UG	Essence of Indian Traditional Knowledge (Non Credit)	-	-	-	-	-	-	-	-	

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Indian Traditional Knowledge refers to the ancient wisdom, practices, values, sciences, arts, and life systems developed in India over thousands of years.

Students should:

- Explain the core essence of Indian Traditional Knowledge.
- Connect ancient knowledge with modern relevance.
- Show critical understanding, not just information collection.
- Present in a clear, structured, and creative way.

Evaluation Guidelines

Evaluation Scheme: Both PPT presentation and spiral-bound report are mandatory for final evaluation.

A. PowerPoint Presentation

S. No.	Criteria
1	Content Accuracy and Depth
2	Understanding of the Essence (Core Philosophy and Values)
3	Coverage of Core Areas (Minimum Three Areas)
4	Case Study and Modern Relevance
5	Structure and Logical Flow
6	PPT Design and Visual Quality
7	Presentation Skills (Confidence, Clarity, Time Management)

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2. Report Structure

- Cover Page (Topic, Name, Course, Semester, Subject, Faculty Name)
- Acknowledgment
- Index
- Introduction
- Sources of Indian Traditional Knowledge
- Core Areas (Minimum Three Areas)
- Case Study
- Modern Relevance
- Challenges and Limitations
- Conclusion (Include Personal Reflection)
- References
- General Instructions

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