



**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**Shri Vaishnav Institute of Information Technology**  
**Choice Based Credit System (CBCS) in Light of NEP-2020**  
**Bachelor of Technology (Computer Science and Business Systems –TCS)**  
**SEMESTER-II (2021-2025)**

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
<b>BTC SH107</b>	<b>BS</b>	<b>Linear Algebra</b>	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>-</b>

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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### COURSE OBJECTIVES

**The student will have ability to:**

1. Know the fundamental principles of the Linear algebra.
2. Understand and apply the basics of the Matrices and Vector Space.

### COURSE OUTCOMES

**After the successful completion of this course students will be able to:**

1. Apply the techniques to find the Solution of Linear equations.
2. Apply the basics of the calculus of the Determinants.
3. Apply the basics of the calculus of the Matrices.
4. Apply the concept of Singular value decomposition and Principal component analysis in Image Processing and Machine Learning.

### SYLLABUS

#### UNIT I

Introduction to Matrices and Determinants; Solution of Linear Equations; Cramer's rule; Inverse of a Matrix.

#### UNIT II

Vectors and linear combinations; Rank of a matrix; Gaussian elimination; LU Decomposition; Solving Systems of Linear Equations using the tools of Matrices.

#### UNIT III

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

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#### UNIT IV

Eigenvalues and Eigenvectors; Positive definite matrices; Linear transformations; Hermitian and unitary matrices;

#### UNIT V

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

#### TEXT BOOKS:

1. Higher Engineering Mathematics, B. S. Grewal.

#### REFERENCES:

1. Advanced Engineering Mathematics, 7<sup>th</sup> Edition, Peter V. O'Neil.
2. Advanced Engineering Mathematics, 2<sup>nd</sup> Edition, Michael. D. Greenberg.
3. Introduction to linear algebra, 5<sup>th</sup> Edition, Gilbert Strang.
4. Applied Mathematics (Vol. I & II) , by P. N. Wartikar& J. N. Wartikar.
5. Digital Image Processing, R C Gonzalez and R E Woods
6. <https://machinelearningmastery.com/introduction-matrices-machine-learning>



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<b>BTC SH108</b>	<b>BS</b>	<b>Statistical Methods</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>-</b>

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### **COURSE OBJECTIVES**

**The student will have ability to:**

1. Understand the concepts of sampling techniques.
2. Analyze the relationship between different features.
3. Examine the hypothesis Analyze the data and draw conclusions from it.
4. Predict the future outcomes.

### **COURSE OUTCOMES**

**After the successful completion of this course students will be able to:**

1. Compute and interpret the samples from given data.
2. Interpret the relationship between variables
3. Perform Test of Hypothesis as well as calculate confidence interval for a population parameter for single sample and two sample cases.
4. Learn non-parametric inference techniques.
5. Interpret temporal data and predict outcomes.

### **SYLLABUS**

#### **UNIT I**

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



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### UNIT II

**Linear Statistical Models:** Scatter diagram. Linear regression and correlation. Least squares method. Rank correlation. Multiple regression & multiple correlation, Analysis of variance (one way, two way with as well as without interaction).

**Estimation:** Point estimation, criteria for good estimates (un-biasedness, consistency), Methods of estimation including maximum likelihood estimation.

### UNIT III

**Sufficient Statistic:** Concept & examples, complete sufficiency, their application in estimation.

**Test of hypothesis:** Concept & formulation, Type I and Type II errors, Neyman Pearson lemma, Procedures of testing.

### UNIT IV

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

### UNIT V

**Basics of Time Series Analysis & Forecasting:** Stationary, ARIMA Models: Identification, Estimation and Forecasting.

### TEXT BOOKS:

1. Probability and Statistics for Engineers (4th Edition), I.R. Miller, J.E. Freund and R. Johnson.
2. Fundamentals of Statistics (Vol. I & Vol. II), A. Goon, M. Gupta and B. Dasgupta.
3. The Analysis of Time Series: An Introduction, Chris Chatfield.



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**REFERENCES:**

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

**List of Practical:**

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

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<b>BTCSCS109</b>	<b>DCC</b>	<b>Data Structures and Algorithms</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>				

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### **COURSE OBJECTIVES**

**The student will have ability to:**

1. To understand efficient storage mechanisms of data for an easy access.
2. To design and implementation of various basic and advanced data structures.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structures.
5. To understand the concept of file organization.

### **COURSE OUTCOMES**

**After the successful completion of this course students will be able to:**

1. Get a good understanding of applications of Data Structures.
2. Develop application using data structures.
3. Handle operations like searching, insertion, deletion, traversing mechanism etc.on various data structures.
4. Decide the appropriate data type and data structure for a given problem.
5. Select the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.

### **SYLLABUS**

#### **UNIT I**

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



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BTCSCS109	DCC	Data Structures and Algorithms	2	1	2	4	60	20	20	30	20				

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### UNIT II

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

### UNIT III

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

### UNIT IV

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

### UNIT V

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

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

### TEXT BOOKS:

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



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**REFERENCES:**

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

**List of Practical:**

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

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<b>BTC SH110</b>	<b>BEC</b>	<b>Principles of Electronics Engineering</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>

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### **COURSE OBJECTIVES**

**The student will have ability to:**

1. An understanding of how devices such as semiconductor diodes, rectifiers and bi-polar junction transistors are working and how they are used in the design of useful circuits.
2. This course provide to foundation education in Operational amplifier & Digital Logic Circuits.
3. Use of Boolean algebra and karnaugh map to simplify logic function.

### **COURSE OUTCOMES**

**After the successful completion of this course students will be able to:**

1. Understand the basic physics of carrier transport in bulk semiconductors and real device structures.
2. Understand the fundamentals of operation of the main semiconductor electronic devices.
3. Understand the basic parameters of electronic devices, their performance, and limiting factors.
4. Inculcate the basic principles, Configurations and practical limitations of an op-amp.
5. Design an optimal logic circuit to meet the given specifications.

### **SYLLABUS**

#### **UNIT I**

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



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<b>BTC SH110</b>	<b>BEC</b>	<b>Principles of Electronics Engineering</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>

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**Diodes and Diode Circuits:** Formation of P-N junction, energy band diagram, built-in-potential, forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance.

Linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation.

#### UNIT II

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

#### UNIT III

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

#### UNIT IV

**Feed Back Amplifier, and Operational Amplifiers:** Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability. Introduction to integrated circuits, operational amplifier and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator

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### UNIT V

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

### TEXT BOOKS:

1. Microelectronics Circuits, Adel S. Sedra and Kenneth Carless Smith
2. Millman's Integrated Electronics, Jacob Millman, Christos Halkias, Chetan Parikh.
3. Digital Logic & Computer Design, M. Morris Mano

### REFERENCES :

1. Electronic Devices and Circuit Theory, Robert L. Boylestad, Louis Nashelsky.
2. Solid State Electronic Devices, 6<sup>th</sup> Edition, Ben Streetman, Sanjay Banerjee
3. Electronic Principle, Albert Paul Malvino.
4. Electronics Circuits: Discrete & Integrated, D Schilling, C Belove, T Apelewicz, RSaccardi.
5. Microelectronics, Jacob Millman, Arvin Grabel.
6. Electronics Devices & Circuits, S. Salivahanan, N. Suresh Kumar, A. Vallavaraj
7. Electronic Devices & Circuit Theory, 11<sup>th</sup> Edition, Robert L. Boylestad, Louis Nashelsky

### List of Practical:

1. Semiconductor Diodes and application,
2. Transistor circuits,
3. JFET, oscillators and amplifiers.

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<b>BTC SH111</b>	<b>SS</b>	<b>Fundamentals of Economics</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>-</b>

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### COURSE OBJECTIVES

**The student will have ability to:**

1. Have indepth understanding of Indian Economic scenario with respect to firms and market, consumer behavior and producer equilibrium.
2. Gain basic understanding about monetary and fiscal policies of government and its sources of revenue.
3. To make them familiar with the knowledge and application of microeconomics and macroeconomics for the formulation of policies and planning.

### COURSE OUTCOMES

**After the successful completion of this course students will be able to:**

1. Develop ideas of the basic characteristics of Indian economy, its potential on natural resources.
2. Comprehend the importance of planning undertaken by the government of India, have knowledge on the various objectives, failures and achievements as the foundation of the ongoing planning and economic reforms taken by the government
3. Understand how factor market and consumer market works. Students will be able to analyze the implications and trade cycles in economy.
4. Demonstrate the meaning and functions of money, Supply of Money – Bank' s CreditCreation.

### SYLLABUS

#### UNIT-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);

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# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

## Shri Vaishnav Institute of Information Technology

### Choice Based Credit System (CBCS) in Light of NEP-2020

#### Bachelor of Technology (Computer Science and Business Systems –TCS) SEMESTER-II (2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment	END SEM University Exam	Teachers Assessment
<b>BTC SH111</b>	<b>SS</b>	<b>Fundamentals of Economics</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>60</b>	<b>20</b>	<b>20</b>	<b>-</b>	<b>-</b>

**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-II

**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;

#### UNIT-III

**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

#### UNIT-IV

**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 — 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.

#### UNIT-V

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

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#### TEXT BOOKS:

1. Microeconomics, Pindyck, Robert S., and Daniel L. Rubinfeld.
2. Macroeconomics, Dornbusch, Fischer and Startz.
3. Economics, Paul Anthony Samuelson, William D. Nordhaus.

#### REFERENCES:

1. Intermediate Microeconomics: A Modern Approach, Hal R, Varian.
2. Principles of Macroeconomics, N. Gregory Mankiw

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessme	END SEM University Exam	Teachers Assessme
BTC SH112	AECC	Business Communication and Value Science – II	2	1	2	4	0	0	0	30	20

<b><u>TEACHING SCHEME:</u></b>	<b><u>EXAMINATION SCHEME:</u></b>	<b><u>CREDITS ALLOTTED:</u></b>
Theory: 3 Hrs./Week	Semester Examination: 50 marks	4
Practical: 7 Hrs. / Week	Continuous Assessment: Yes	
Lab: 7 Hrs. / Week	Term Work: 50 marks	

Leadership Oriented Learning (LOL)		
Nature of Course	Behavioral	
Pre requisites	Basic Knowledge of English (verbal and written) Completion of all units from Semester 1	
<b>Course Objectives:</b>		
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) Behavior and beliefs c) Diversity & Inclusion	
<b>Course Outcomes:</b> Upon completion of the course, students shall have ability to:		
C2.6.1	Understand tools of structured written communication	[U]
C2.6.2	Use tools of structured written communication	[AP]
C2.6.3	Use electronic/social media to share concepts and ideas	[AP]

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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 behavior	[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 a cause	[C]

<b>Course Contents:</b>	
<ul style="list-style-type: none"><li>• <b>Identification of common errors in written communication and ways of rectification</b></li><li>• <b>Understanding speed reading techniques – Skimming and Scanning</b></li><li>• <b>Application of reading and writing skills</b></li><li>• <b>Analyzing personality traits and team player style</b></li><li>• <b>Understanding the concepts of Morality, Diversity and Inclusion</b></li><li>• <b>Application of these concepts</b></li><li>• <b>Creation of communication material</b></li><li>• <b>Experiencing diversity and organizing events to support inclusion</b></li><li>• <b>Assignment – Assimilation of concepts and present them effectively</b></li></ul>	
<b>Total Hours:</b>	<b>61</b>
<b>Text Books:</b>	
	There are no prescribed texts for Semester 2 – there will be handouts and reference links shared.
<b>Reference Books:</b>	
1	Guiding Souls : Dialogues 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-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

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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. Diamandis and Steven Kotler; Published: 21 Feb, 2012; Publisher: Free Press
6	Start With Why: How Great Leaders Inspire Everyone 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 <a href="https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf">https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf</a>
2	A Framework for Making Ethical Decisions <a href="https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions">https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions</a>
3	Five Basic Approaches to Ethical Decision- <a href="http://faculty.winthrop.edu/meelerd/docs/rolos/5_Ethical_Approaches.pdf">http://faculty.winthrop.edu/meelerd/docs/rolos/5_Ethical_Approaches.pdf</a>

**Online Resources:**

1	<a href="https://youtu.be/CsaTslhSDI">https://youtu.be/CsaTslhSDI</a>
2	<a href="https://m.youtube.com/watch?feature=youtu.be&amp;v=IIKvV8_T95M">https://m.youtube.com/watch?feature=youtu.be&amp;v=IIKvV8_T95M</a>
3	<a href="https://m.youtube.com/watch?feature=youtu.be&amp;v=e80BbX05D7Y">https://m.youtube.com/watch?feature=youtu.be&amp;v=e80BbX05D7Y</a>
4	<a href="https://m.youtube.com/watch?v=dT_D68RJ5T8&amp;feature=youtu.be">https://m.youtube.com/watch?v=dT_D68RJ5T8&amp;feature=youtu.be</a>
5	<a href="https://m.youtube.com/watch?v=7sLLEdBgYYY&amp;feature=youtu.be">https://m.youtube.com/watch?v=7sLLEdBgYYY&amp;feature=youtu.be</a>

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

**Formative 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- Form an 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**

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<b>Bloom's Level</b>		
Understand	Written Assessment, project and group discussion	50
Apply		
Analyze		

**Lesson Plan**

Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
			Icebreaker. 1) Participate in 'Join		
Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
1			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



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1	Understand tools of structured written communication	Understand	Research on the social cause each group will work for.	Practical (practical)	90 Minutes
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			<b>Group Practical</b> – As a group, they will work on the social issue identified by them. Research, read and generate a report based on the findings.(Apply the	Formative evaluation	70 Minutes
<b>Unit No</b>	<b>Objective</b>	<b>Bloom's Level</b>	<b>Content</b>	<b>Type of Class</b>	<b>Duration</b>
			learning and recap from the session)		
1	Create communication material to share concepts and ideas	Create	<b>Practical:</b> 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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<b>1</b>	Understand tools for Lucid writing	Understand	Lucid Writing: Encourage the students to go through the links given about Catherine Morris and Joanie McMahan’s writing techniques.	Theory and Discussion	30 mins
<b>1</b>	Create communication material to share concepts and ideas	Create	Create the magazine	Practical (Lab)	90 Minutes
<b>1</b>		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
<b>Unit No</b>	<b>Objective</b>	<b>Bloom’s Level</b>	<b>Content</b>	<b>Type of Class</b>	<b>Duration</b>

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1	Use electronic/social media to share concepts and ideas	Apply	Launching an E Magazine.	Practical (Lab)	120 Minutes
1			<b>Quiz Time</b>	Summative Evaluation for Unit	60 Minutes
<b>Unit 2</b>					
2	Develop materials to create an identity for an organization dedicated to a social cause	Create	Each group will form an NGO. Create Vision, Mission, Value statement, tagline 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
2	Assess presentation based on given criteria	Evaluate	Group to come back and share their findings from the recording. Post work- individual	Sharing of learning, written and Practical and formative	60 Minutes & 60 Minutes
<b>Unit No</b>	<b>Objective</b>	<b>Bloom's Level</b>	<b>Content</b>	<b>Type of Class</b>	<b>Duration</b>
			write up to be written and evaluated for the E-magazine	evaluation	

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2	Create communication material to share concepts and ideas  Use electronic/social media to share concepts and ideas	Create Apply	Prepare and publish the Second episode of the E Magazine.	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			<b>Quiz Time</b>	Summative Evaluation for Unit	60 Minutes
<b>Unit 3</b>					
3	Develop materials to create an identity for an organization dedicated to a social cause		Ad campaign- Brain storming session- Students to discuss and explore the means of articulating	Discussion	60 Minutes
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		Create	and amplifying the 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 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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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's 8 team	Practical based learning followed by a presentation	40 Minutes
Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
			player styles		
3	Identify individual personality types and role in a team.	Understand	(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 behavior	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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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			<b>Quiz Time</b>	Summative Evaluation for	60 Minutes
<b>Unit No</b>	<b>Objective</b>	<b>Bloom's Level</b>	<b>Content</b>	<b>Type of Class</b>	<b>Duration</b>
				Unit	
<b>Unit 4</b>					
4	Understand the basic concepts of Morality and Diversity	Understand	Ten minutes of your time – a short film on diversity. Play the video (link to be attached in the FG)	Video discussion &	30Minutes
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
4	Understand the basic concepts of Morality and Diversity	Understand	Touch the target (Blind man) - Debriefing of the Practical.  Film: "The fish and I" by Babak Habibifar" (1.37mins)	Practical and discussion	60 Minutes

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4	Create communication material to share concepts.	Create	Groups to create a 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	Create	Write a review in a blog on the topics they are covering in	Written Practical	60 Minutes
<b>Unit No</b>	<b>Objective</b>	<b>Bloom's Level</b>	<b>Content</b>	<b>Type of Class</b>	<b>Duration</b>
	concepts.		their research. Theory will give grades to each team.	and Formative Evaluation	
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
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

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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 formative evaluation and	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 formative Evaluation and	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.  Use the electronic/social media to share concepts and ideas	Create  Apply	Prepare and publish the final episode of the E Magazine.	Practical	120 Minutes
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	<b>Revisit your resume</b> Include your recent achievements in your resume.	Submit it to the Professor	Lab time-30 Minutes
4			<b>Quiz Time</b>	Summative Evaluation for Unit	60 Minutes

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<b>4</b>	Organize an event to generate awareness and get support for a cause	Create	<p><b>Project-1)</b> Each team to look for an NGO/ social group in the city which is working on the issue their college group is supporting.</p> <p>2) Spend a <b>day with the NGO/ social group</b> to understand exactly how they work and the challenges they face.</p> <p>3) Render voluntary service to the group for one day</p> <p>4) Invite the NGO/</p>	Field work: Formative Evaluation	7 Hours
Unit No	Objective	Bloom's Level	Content	Type of Class	Duration
			<p>social group to address their university students for couple of hours. Plan the entire event, decide a suitable venue in the university, gather audience, invite faculty members etc. (they need to get their plan ratified their professor). Outcome-- Host an interactive session with the NGO spokesperson</p> <p>5) The groups to present their experience of a <b>day with the NGO</b> and inspire students to work for the cause.</p>		
<b>TOTAL</b>					<b>61 hours</b>

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	<b>Assessment</b>	Understand	Written Assessment of 20 marks		
		Create	Project of 20 marks (E-Magazine 4 editions)		
		Analyze, Create	Focus Group Discussion 10 marks		

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment	END SEM University Exam	Teachers Assessment
<b>BTCNSC113</b>	-	<b>Environmental Sciences (Non-Credit)</b>	<b>1</b>	-	-	-	-	-	-	-	<b>50</b>

**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:**

1. The students will study basic components of the environment and various types of pollution affecting the environment.
2. The students will study how to differentiate various types of waste and ways to manage these wastes.
3. The students will learn the impact studies associated with the environment and social issues, and methods to manage them. They will also be acquainted with various legal aspects associated with the environment and study the roles of various stakeholders associated with the environment.

**Course Outcomes:**

1. Discuss various types of environmental Pollution, natural resources and its misuse.
2. Demonstrate a plan for water management, promotion of recycle and reuse, generation of less waste, avoiding electricity waste.
3. Demonstrate a slogan, poster and plan activities for environmental protection and social issues.

**Syllabus**

S.no	Title	Topics to be covered
1	Introduction to Environment and its components:	Natural Resources and it Misuse leading to Environmental degradation. Role of Ecology in Environmental Degradation and Protection. Major industrial and other environmental disasters Environmental pollution-Types, Causes, Effects, Reduction methodology.
2	Waste Generation and Waste Management	Introduction to waste generation, Methods to Reduce, Reuse and Recycle of Waste Importance of 3R's, Promotion of 3R's - Methods Solid wastes, Industrial Waste, Bio-Medical Waste and Hazardous waste management .– Types, Storage, Transportation, Treatment Disposal. C&D and E-waste – Concept, methods for reduction, management Campaigning for waste reduction and management.
3	Assessment and Management	Concept of EIA and SIA, significance, methodology, report drafting. Environmental Management System, ISO 14000 EMS certification

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S.no	Title	Topics to be covered
4	Protection, Social Issues	Environmental Protection, Social Issues, Disaster Management Social Issues and Environment International Conventions, Summits and Protocols Generation of less waste and avoiding electricity waste. Environmental management for construction Projects.
5	Government Role	Role of the Government in managing the environmental activities in all sectors. Organisational set up at the Central and state level to manage the environment. Role of judiciary in managing the environment. Role of Citizens, Role of NGOs/ Environmental Activists. Major Laws Air (P&C.P.) Act, Water (P & C.P) Act. Environment Protection Act EPA 1986. Wild life Protection Act etc., PIL

**Text/Reference Books:**

1. Benny Joseph, “Environmental Studies”, The McGraw-Hill Companies, 2017.
2. Gerard Kiely, “Environmental Engineering”, Tata McGraw-Hill Education, 2007
3. Mackenzie Davis, David Cornwell, “Introduction to Environmental Engineering”, McGraw-Hill Companies, 2017.
4. P. Aarne Vesilind, Susan M. Morgan, “Introduction to Environmental Engineering”, Thomas/Brook/Cole, 2004

**ASSESSMENT COMPONENTS**

The students will present a report through seminar, which will be held by a Faculty Coordinator constituted by the concerned department as per norms of the institute. The evaluation through seminar presentation will be based on the following criteria.

- a) Quality of material presented.
- b) Effectiveness of presentation.
- c) Depth of knowledge and skills.