

B.COM. COURSE STRUCTURE UNDER NATIONAL EDUCATION POLICY (NEP)

SEMESTER II

CATEGORY	PAPER
Major 1 COM-101	Elements of Cost
Minor 1 COM-112	Fundamental of Banking
MC ECO-132	Globalisation
AEC 1 ENG-152	Digital Content Creation in English
SEC COM-149	Introduction to Agripreneurship
VAC VAC-112	Green Energy System
VAC VAC-118	Youth Empowerment using Mind Management

Semester II

Name of the Programme: Bachelor of Commerce (Honors)

Course Code: COM-101 Title of the Course: Elements of Cost

Number of Credits: 04

Effective from AY: 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	<p>Objectives of the Course are:</p> <ol style="list-style-type: none"> 1. To acquaint the learners with various cost concepts and cost classification 2. To familiarize the learners with material cost and employee cost 3. To acquaint learners with classification of and accounting for overhead costs. 4. To enable learners to prepare cost sheet. 	
Content:	<p>Unit 1: Introduction to Cost Accounting Meaning, Scope, Objectives, Limitations of Cost Accounting; Installation of a Costing System; Cost Centre, Cost Unit, Cost Classification; Overview of elements of cost; Role of Cost Accountant in an organisation.</p>	10 hours
	<p>Unit 2: Elements of Cost: Material and Employee Cost Material: Meaning & Need, Essentials of Material Control; Functions of Purchase Department; Purchase Requisition, Stores Control; Issue of Materials: Methods of pricing of material issues- FIFO, LIFO and Weighted Average Price method, Economic Order Quantity (EOQ); Cost Accounting and treatment of losses- Wastage, scrap, spoilage and defectives. Employee Cost: Attendance & Payroll procedures, Elements of wages; Employee Turnover: Causes, Methods of calculating Employee Turnover; concept of idle time and overtime; System of wage payments and methods: Time Rate, Piece Rate, Taylor's Differential Piece Rate, Halsey Premium Plan & Rowan Plan.</p>	20 hours
	<p>Unit 3: Elements of Cost: Overheads Meaning, Importance & Classification of Overheads; Cost Allocation & Apportionment, Basis of Apportionment, Methods of Primary & Secondary Distribution; Overhead Absorption Rates. Activity Based Costing (ABC).</p>	15 hours
	<p>Unit 4: Cost Sheet Cost Sheet: Meaning, Characteristics, Objectives, Limitations; Preparation of Cost Sheet, Estimated Cost Sheet</p>	15 hours

Pedagogy:	Lectures, Discussions, Presentations, Case Studies, Assignments, Class Activities
Reference/ Readings:	<ol style="list-style-type: none"> 1. Jain S. P., & Narang, K.L. (2014). Cost Accounting Principles and practice – Kalyani Publishers, Ludhiana. 2. LAL, B. M., Nigam, B., & Jain, J.C. (2000). Cost Accounting Principles and practice. Hall of India Pvt. Ltd., New Delhi. 3. Bhar, B. K. (2012). Cost Accounting- Methods & Problems. Academic Publishers Calcutta 700073. 4. Maher, M. W., & Clyde, P. S. (2006). Cost Accounting: Principles and Practice. ICC, McMillan Inc. 5. Tulsian, P. C. (2018). Practical Costing. Publishers Sultan Chand. New Delhi 6. Khan, M. Y., & Jain, P.K. (2003). Theory and Problems of Management and Cost Accounting- Tata McGraw Hill Publishing co. Ltd. New Delhi.
Course Outcomes:	<p>After completion of this course, the learners will be able to:</p> <ol style="list-style-type: none"> 1. Explain various concepts in cost accounting. 2. Identify and account for elements of material and employee costs. 3. Identify and account for elements of overhead costs. 4. Prepare cost sheet.



Name of the Programme: Bachelor of Commerce (Honors)

Course Code: COM-112

Title of the Course: Fundamentals of Banking

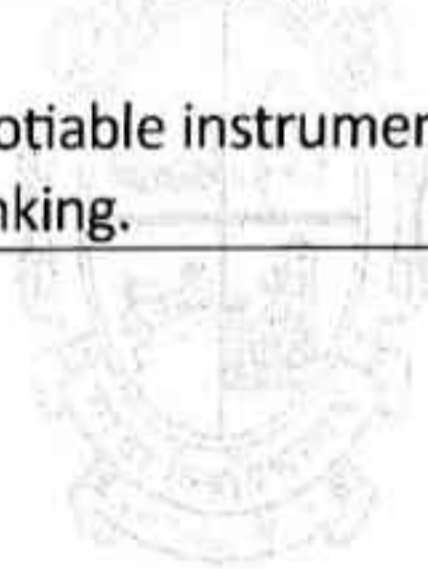
Number of Credits: 04

Effective from AY: 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	<p>Objectives of the Course are:</p> <ol style="list-style-type: none"> 1. To acquaint the learners with the structure, types, and systems of banking. 2. To impart knowledge of functions, types of customers and banker-customer relationship. 3. To familiarize the learners with Negotiable Instruments 4. To equip the learners with the basics of e-banking 	
Content:	Unit 1: Introduction to Banking	10 hours
	<p>Origin of Modern Banking in India, Meaning and Definition of Banking.</p> <p>Structure of Banking in India & Types of Banks: Public Sector Banks, Private Sector Banks, Foreign Banks, Regional Rural Banks, Payment Banks, Small Saving Banks.</p> <p>System of Banking: Unit Banking and Branch Banking.</p> <p>RBI: History, Role, and Functions.</p>	
	Unit 2: Functions, Types of Customers and Banker-Customer Relationship	20 hours
	<p>Primary Functions</p> <p>Accepting Deposits: Importance of Deposits, Classification of Deposits – Demand, Time and Hybrid, Different types of Deposits – Saving, Current, Fixed, Recurring and Hybrid.</p> <p>DEMAT Account: Meaning and Functions.</p> <p>Loans and Advances: Importance of Lending, Principles of Lending, Classification of Lending: Fund Based Credit Facilities – Cash Credit, Overdraft, Demand Loan, Bill Purchased, Bill Discounted, Project Finance. Non-fund Based Credit Facilities – Guarantees, Letter of Credit.</p> <p>Secondary Functions and other Functions</p> <p>Utility Function, Agency Function and Other Fee Based Services</p>	
	<p>Types of Bank Customers and Procedure and Practice in Opening Accounts of Different Customers: Minor, Individual Joint Account. KYC Norms and e-KYC.</p> <p>Banker-Customer Relationship – General and Termination.</p>	
Unit 3: Negotiable Instruments	15 hours	
<p>Introduction – Meaning and Definition – Features – Kinds of Negotiable Instruments: Promissory Note, Bills of Exchange, and Cheque.</p>		

	<p>Crossing of Cheque, Types of Crossing; Endorsements: Meaning, Importance and Kinds of Endorsement, Rules for Endorsement.</p> <p>Paying Banker: Introduction-meaning-Role-Functions-Duties.</p> <p>Collecting Banker: Introduction-Meaning-Legal status of collecting banker- Holder for Value-Holder in due course.</p>	
	<p>Unit 4: E-Banking in India</p> <p>Meaning, Characteristics, Benefits and Drawbacks of E-Banking, Types of E-Banking.</p> <p>ATM, Debit Card, Credit Card, NEFT, RTGS, ECS (Debit and Credit)– Meaning, Features and Functions.</p> <p>NPCI: Functions and Products – Aadhaar Enabled Payment Systems, Bharat Bill Payment System, BHIM, Cheque Truncation System, Digital Rupee, Immediate Payment Service, National Automated Clearing House, National Common Mobility Card, National Financial Switch, NUUP Services, RuPay, Unified Payments Interface, BharatQR. (in brief).</p>	<p>15 hours</p>
<p>Pedagogy:</p>	<p>Lectures, Group discussions, Seminars, Case studies, Field work</p>	
<p>Reference/ Readings:</p>	<p>Books:</p> <ol style="list-style-type: none"> 1. Natarajan, S, and Parameswaran R, (2015). Indian Banking (Revised Ed.). S. Chand. 2. Indian Institute of Banking and Finance, (2016). Digital Banking. Taxmann. 3. Indian Institute of Banking and Finance,(2010). Banking Products and Services. Taxmann. 4. Indian Institute of Banking and Finance (2015). Principles & Practices of Banking (3rd Ed). Macmillan Education. 5. Indian Institute of Banking and Finance, (2010). Basics of Banking. Taxmann. 6. Khubchandani, B S, (2000). Practice and Law of Banking. Macmillan. 7. Agarwal O P, (2012). Modern Banking of India (2nd Ed.). Himalaya Publishing House. 8. Srivastava P K, (2013). Banking: Theory and Practice (12th Ed). Himalaya Publishing House. 9. Kandasami K P , Natarajan S, Parameswaran R, (2009). Banking Law and Practice (4th Ed.) S. Chand. 10. Gordon and Natarajan, (2006). Banking: Theory, Law and Practice (12th Ed). Himalaya Publishing House. <p>Journals:</p> <ol style="list-style-type: none"> 1. The Indian Banker, published by Indian Banker Association 2. Bank Quest, published by Indian Institute of Banking and Finance 3. Trends and Progress of Indian Banking (Annual) published by RBI. <p>Websites:</p> <ol style="list-style-type: none"> 1. Reserve Bank of India - www.rbi.org.in 2. Indian Institute of Banking and Finance - www.iibf.org.in 	

	<ol style="list-style-type: none"> 3. Indian Banker's Association - www.iba.org.in 4. Institute of Banking Personal Selection - www.ibps.in 5. Institute of Finance, Banking and Insurance - www.ifbi.com 6. State Bank of India - www.onlinesbi.sbi 7. National Payment Corporation of India - www.npci.org.in
Course Outcomes:	After the completion of this course, the learners will be able to:
	<ol style="list-style-type: none"> 1. Explain the structures, types and systems of banking. 2. Explain the functions, types of customers and banker-customer relationship. 3. Elucidate negotiable instruments. 4. Practice e-banking.



Name of the Programme: **Bachelor of Arts**

Course Code: (MC) ECO-132

Title of the Course: **Globalisation**

Number of Credits: **03**

Total marks: **75**

Effective from AY: **2023-24**

Prerequisites for the course:	NIL
Course Objective: The course familiarizes students with dynamics of globalisation. It focuses on issues pertaining to globalization, global economic transitions and various other aspects related to it.	

Topic	Syllabus	Extended Syllabus	Reference Book /Page Number	Lectures	Marks
Unit I: Evolution of Globalisation	Meaning Definition	<ul style="list-style-type: none"> • Meaning of Globalisation • Definition of Globalisation 	Francis Cherunilam, "Global Economy and Business; 199 Francis Cherunilam(2010) International Business: Text and Cases; 447- 448 Cherunilam Francis (2012): International Economics; 83-84	15	25
	Globalisation of World Economy	<ul style="list-style-type: none"> • Introduction to Global or Transnational Economy • Features of Transnational Economy 	Francis Cherunilam, "Global Economy and Business; 200-201 Francis Cherunilam (2010) International Business: Text and Cases; 451-452 Cherunilam, Francis (2012) : International Economics; 83		
	Evolution of Globalisation	<ul style="list-style-type: none"> • First Phase of globalisation began in 1870and ended with World War-I. • The efforts of IMF, World Bank and WTO to liberalise their economies. • Shift from exporting/importing to International Marketing 	P. Subba Rao (2017); 2-3		

	Comparison between old and new Globalisation (1870-1913 and 1950 onwards)	Two Phases <ul style="list-style-type: none"> • Phase 1: 1870-1913 • Phase 2: 1950 onwards 	Francis Cherunilam (2010) International Business: Text and Cases; 451-454 Cherunilam, Francis (2012) : International Economics; 83 Francis Cherunilam, "Global Economy and Business; 215-218		
	Types of Globalisations	<ul style="list-style-type: none"> • Economic globalisation. • Political globalisation • Cultural globalisation • Environmental globalisation • Technical globalisation 	Subba Rao (2017); 158-159		
	Stages of Globalisation.	<ul style="list-style-type: none"> • Five Different Stages of development before the firm develops into a Global Corporation 	P. Subba Rao (2017); 12-13 Francis Cherunilam, "Global Economy and Business; 202-203		
	Essential Conditions of Globalisation;	<ul style="list-style-type: none"> • Business freedom • Facilities • Government Support • Resources • Competitiveness • Orientation 	P. Subba Rao (2017); 184 Francis Cherunilam, "Global Economy and Business; 203-204 Francis Cherunilam(2010) International Business: Text and Cases; 459-460		
Unit II: Salient Aspects of Globalisation	Drivers of globalisation; /factors contributing to globalisation	<ul style="list-style-type: none"> • Establishment of WTO • Growth of regional integration decline in trade barriers • Decline in investment barriers increase in FDI • Technological changes and 	P. Subba Rao (2017) ; 3-8	15	25

		Growth of MNC			
	Features of New Phase of Globalisation	<ul style="list-style-type: none"> • New markets • New tools of communications • New Actors • New Rules and norms 	Francis Cherunilam, "Global Economy and Business; 217-218		
	Advantages and Disadvantages of Globalisation	<u>Advantages of Globalisation</u> <ul style="list-style-type: none"> • Free flow of capital and increase in the total capital employed. • Free flow of technology. • Increase in industrialisation • Spread of production facilities throughout the globe. • Balanced development of world economies • Commodities at lower prices with high quality • Increase in production and consumption <u>Disadvantages of Globalisation</u> <ul style="list-style-type: none"> • Globalisation kills domestic business • Exploits human resources • Increase in welfare and prosperity • Decline in demand for domestic products • Decline in income • Widening gap between rich and poor 	Francis Cherunilam(2010) International Business: Text and Cases ; 463-465		
			P. Subba Rao (2017) ; 173-177		

		<ul style="list-style-type: none"> • Leads to unemployment and underemployment 			
	Globalisation Challenges	<ul style="list-style-type: none"> • Survival of a firm in competitive environment • Foreign Investment • Increases economic inequality • Better technology • Clear and Proper Policy etc. 	Cherunilam, Francis (2012: International Economics; 92-93		
	Obstacles to Globalisation	<ul style="list-style-type: none"> • Government Policies and Procedures • High Cost • Poor infrastructure • Obsolete technology • Resistance to change • Poor quality image • Supply Problems • Small size firms • Lack of experience • Limited R& D and marketing research • Growing competition • Trade barriers 	Francis Cherunilam, "Global Economy and Business; 204-213		
	Policy measures to safeguard the interest of Developing Countries	<ul style="list-style-type: none"> • International Policy measures • National Policy measures 	Francis Cherunilam, "Global Economy and Business; 223-224 Cherunilam, Francis (2012) : International Economics; 93-94		
	Global Market Entry Strategies	<ul style="list-style-type: none"> • Exporting • Licensing • Franchising • Contract manufacturing • Joint venture • Mergers and acquisitions • Strategic alliance • 	Francis Cherunilam, "Global Economy and Business; 204-213		
	Role of Global Institutions	<ol style="list-style-type: none"> 1. WTO: <ul style="list-style-type: none"> • Brief introduction • Objectives • Principles 	Francis Cherunilam, "Global Economy and Business; 178-180		

		<ul style="list-style-type: none"> • WTO pillar of global business <p>2. IMF:</p> <ul style="list-style-type: none"> • Brief introduction • Purposes • Training and technical Assistance 	<p>P. Subba Rao (2017) ; 204</p> <p>Francis Cherunilam, "Global Economy and Business; 291</p> <p>P.Subha Rao(2017) ; 419</p>		
Unit III: Components of Economic Globalisation and measurement	Role of transnational companies	<p>Transnational Companies</p> <ul style="list-style-type: none"> • Meaning • Characteristics 	P. Subba Rao (2017); 13-15	15	25
	Globalisation Process	<ul style="list-style-type: none"> • 5 stages of growth of Transnational Companies 	P. Subba Rao (2017);163		
	Components of Economic Globalisation:-- Globalisation of Markets, Globalisation of Production, Globalisation of investment and Globalisation of technology	<ul style="list-style-type: none"> • Meaning • Features • Reasons 	P. Subba Rao (2017) ; 167-172		
	KOF Index of Globalisation.	<ul style="list-style-type: none"> • Brief introduction on Integrated Globalisation and KOF Index 	P. Subba Rao (2017); 158,159		

Learning Outcomes

Upon completion of the Course the students will be able to:

- Comprehend the meaning and dimensions of globalisation.
- Examine the drivers of globalisation, policy measures, Global Market Entry Strategies and evaluate the problems and prospects of globalisation.
- Discuss the globalisation process, integrated globalisation and KOF Index.

Name of the Programme : B.A. English
 Course Code : ENG-152
 Title of the Course : Digital Content Creation in English
 Number of Credits : 02
 Effective from AY : 2023-24

Pre-requisites for the Course:	Knowledge of the digital medium coupled with an interest to create content for various online digital platforms	
Course Objectives:	<ul style="list-style-type: none"> To introduce students to the process, genres and types of writing for digital platforms To enhance multimedia literacy skills among students To build confidence and ability in using digital technology for communication 	
		No. of Hours
Content:	Unit 1 –Digital Presentations <ul style="list-style-type: none"> Use of various software PowerPoint / Prezi (the Zooming Presentation Editor)/ Mind-Mapping Software Learning the principles of slide designing - Slide: ology/Zen Presentation skills (tone of voice, body language, eye-contact, etc.) 	15
	Unit 2 – Content creation Creating a blog Digital Story Telling <ul style="list-style-type: none"> Elements of a story and preparation of a storyboard Create/compose the digital story using appropriate software 	15
Pedagogy:	A combination of traditional writing skills and the use of technology to create, share and publish written content by introducing the students to a variety of digital tools, such as word processors, blogging platforms, and social media	
References/Readings:	<ol style="list-style-type: none"> Frazel, Midge. <i>Digital Storytelling: Guide for Educators</i>, International Society for Technology in Education, 2010. Hindle, Tim. <i>Making Presentations</i>. Dorling Kindersley Publishers, 1999. Raina, Roshan Lal et al. <i>Professional Communication</i>. Himalaya Publishing House, 2012/ later editions Reynolds, Garr. <i>Presentation Zen: Simple Ideas on Presentation Design and Delivery</i>. 2nd edition, Voices that Matter, 2011. Zelazny, Gene. <i>Say it with Presentations</i>. Tata McGraw Hill Education, 2004. 	

Course Outcomes:	On completion of the course, the student will be able to do the following: <ol style="list-style-type: none">1. Create and deliver individual presentations using a variety of digital software2. Compose and present a digital story3. Identify and distinguish between different genres of writing4. Write a book/ film review5. Interpret graphic data to arrive at an informed conclusion
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Name of the Programme: Bachelor of Commerce (Honors)

Course Code: COM-149

Title of the Course: Introduction to Agripreneurship

Number of Credits: 03 (1T+2P)

Effective from AY: 2023-24

Pre-requisites for the Course:	Course related to Innovation and Startup should have been completed so that the basics of entrepreneurship is clear.	
Course Objectives:	Objectives of the Course are: 1. To create awareness regarding the Agripreneurial activities. 2. To familiarize learners with Agri-business Operations. 3. To acquaint learners with knowledge of specific Agri businesses.	
Content:	<p>Unit 1: Agripreneurship – Concept, Need and Scope Need for Agripreneurship, Role of Agripreneurship in National Economy, Scope of Entrepreneurship Development in Agriculture, Types of Agripreneurship Enterprises; Areas of Entrepreneurship Development in Agriculture: Agro Produce processing units, Agro Produce manufacturing units, Agro-inputs manufacturing units, Agro service centers, Miscellaneous areas; Challenges for Agripreneurship Development in India, Problems Faced by Agripreneurs, Motivation for Agribusiness Start-Ups; General Entrepreneurial Skills for a Agripreneurs, Broader Business Areas and options of business selection around Agripreneurship</p>	15 hours
	<p>Unit 2: Managing Agri-business Operations (Practical) Identifying Quality Management Parameters in Agricultural Business, Designing Marketing Plan for Agribusiness, Preparing Financial Plan for Agribusiness, Evaluating Microfinance facilities in Agri Business; Identifying risks in Agribusiness, Ascertaining role of players in Agri-supply Chain, Evaluate Agricultural Information Systems, Identify Distribution Networks for Agri Sales</p>	30 hours
	<p>Unit 3: Specific Agri-businesses (Practical) Design business models for: Farm, Dairy Products, Poultry and Hatchery, Floriculture and Landscaping, Vegetable, Fruit Production, Organic Food Production Technology, Livestock product, Food Technology and Processing, Feed Business, Fertilizer Technology</p>	30 hours
Pedagogy:	Lectures, Discussions, Presentations, Case Studies, Assignments, Class Activities	
Reference/ Readings:	<ol style="list-style-type: none"> Pandey, L. (2022). Introduction to Agripreneurship, Bio-Green Books Mailappa, A. S., & Hazarika, B. N. (2021). Agri Startups and Agri Business. Brillion Publishing. Gupta, L., Vyas, R., Sharma, S. K., Gupta S., & Kumar, A. (2022). Handbook of Agricultural Entrepreneurship. Satish Serial Publishing House. Panigrahy, S. R., Kumar S., & Singh, R. (2015). Objective Agribusiness 	

	Management. Scientific Publishers. 5. Das, S. B., Khare, D., Nahatkar, S. B. R., Pahalwan, D. (2022). Agri Entrepreneurship Opportunities, Scientific Publishers.
Course Outcomes:	After completion of this course, the learners will be able to: 1. Perform various agripreneurial activities. 2. Discuss the challenges for Agripreneurship Development in India. 3. Demonstrate competencies to manage Agri-business Operations. 4. Demonstrate competencies to manage specific Agri businesses.



Prerequisites	Should not have had any major Health Issues, to be ascertained by the Teacher before the commencement of the course	
Course Objectives:	<ol style="list-style-type: none"> 1. To understand the relationship between the rhythms of our breath and our emotional state. 2. To understand the fundamentals of how the mind works, the tendencies and habits of the mind, the relationship between our state of mind and happiness. 3. To learn how to quieten the mind to increase focus and mental clarity by practice of the Healing Breath technique (SudarshanKriya) and the practice of light Yoga. 	
Content:	The Seven Levels of our existence - Body, Breathe, Mind, Intellect,Memory, Ego and Self. Sources of Energy - Prana and the Breath; Food: Types of Food and Its Effect; Sleep and Its Effect on the Body/Mind Complex.	3 hours
	Bringing the Mind to the Present - Practical knowledge to eliminate counterproductive activity; Discussion of tendencies of the mind, including worry, regret and aversion. Learn how to use practices to overcome negative mental habits (i.e. complaining, gossiping) and strengthen positive mental qualities (i.e. focus and commitment). How to enhance learning ability; techniques and interactive processes to improve memory, concentration & focus.	6 hours
	Interpersonal Relations - The Modes of Acceptance – People, Situations; The Complementary Nature of Opposite Values. Roles in Life, Responsibility, Service – Impacting our Communities and the World;	3 hours
	Discussion of the qualities of a leader – giving 100%, responding to the needs of a situation, and maintaining enthusiasm. Sudarshan Kriya for restoring the rhythm in breathe to overcome stress and increase the energy levels	6 hours
	A Community Engagement Mini-Project/Internship addressing any problem under the themes of – Health and Hygiene, Waste Management, Water Management, Energy Management, and Greenery in any Village of Goa	12 hours
Pedagogy:	Group Activities, Experiential learning using simple processes, games, Visits to Villages	
References/ Readings:	Resource Material/Manual of Art of Living Foundation, Bangalore for YES+ Programme	
Course Outcomes:	<ol style="list-style-type: none"> 1. Students will become aware of their way of communication and will improvise by practice their confidence and communication skills. 2. Students will understand how their own emotions are tied to the breath and nervous system. They will experience how the Sudarshan Kriya™ affects emotions, memory and overall well-being. 3. Students will understand how to manage their interpersonal relationships with acceptance and improved communication. 4. They will be able to navigate the roles they play in life in a very effective manner 	

Name of the Programme: UG General Education Programmes

Course Code: VAC-112

Title of the Course: Green Energy Systems

Number of Credits: 02

Effective from AY: 2023-24

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Pre-requisites for the Course	Nil	
Course Objectives:	<ol style="list-style-type: none">1. To demonstrate the importance of solar energy collection and storage.2. To understand the principles of wind energy and biomass energy.3. To gain knowledge on geothermal and ocean energy.4. To gain knowledge on geothermal and ocean energy.5. To understand the concepts of green manufacturing systems.	
Content:	<p>Unit I Solar, Wind and Biomass Energy Solar (10 hours) SOLAR RADIATION: Role and potential of new and renewable sources, the solar energy option, Environmental impact of solar power, structure of the sun, the solar constant, sun-earth relationships, coordinate systems and coordinates of the sun, extra-terrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data, numerical problems. Photo voltaic energy conversion – types of PV cells. SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation. SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications- solar heating/cooling technique, solar distillation and drying, solar cookers, central power tower concept and solar chimney. Wind and Biomas (5 hours) WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, betz criteria, types of winds, wind data measurement.</p> <p>BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of bio-gas digesters, gas yield, utilization for cooking, bio fuels, I.C. engine operation and economic aspects.</p>	15 hours
	<p>Unit II Geothermal And Ocean Energy, Energy Efecient Systems, And Green Manufacturing Systems GEOHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy. OCEAN ENERGY: OTEC, Principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques.</p> <p>(A) ELECTRICAL SYSTEMS: Energy efficient motors, energy efficient lighting and control, selection of luminaire, variable voltage variable frequency drives (adjustable speed drives), controls for HVAC (heating, ventilation, and air conditioning), demand site management.</p> <p>(B) MECHANICAL SYSTEMS: Fuel cells- principle, thermodynamic</p>	15 Hours

	<p>aspects, selection of fuels & working of various types of fuel cells, environmentally friendly and Energy efficient compressors and pumps.</p> <p>Environmental impact of the current manufacturing practices and systems, benefits of green manufacturing systems, selection of recyclable and environment friendly materials in manufacturing, design and implementation of efficient and sustainable green production systems with examples like environmentally friendly machining, vegetable based cutting fluids, alternate casting and joining techniques, zero waste manufacturing.</p>	
Pedagogy:	Lectures/Experiential Learning	
References/Readings:	<ol style="list-style-type: none"> 1. Sukhatme S.P. and Nayak J.K. <i>Solar Energy – Principles of Thermal Collection and Storage</i>, Tata McGraw Hill, 1984. 2. Khan B.H, <i>Non-Conventional Energy Resources</i>, Tata McGraw Hill, New Delhi, 2006. 3. Paulo Davim J. , <i>Green Manufacturing Processes and Systems</i>, Springer 2013. 4. K.S Jagadeesh, B.V Venkata Rama Reddy and K.S Nanjunda Rao <i>Alternative Building Materials and Technologies</i> 2nd edition, New Age International, 2017. 5. D.Yogi Goswami, Frank Krieth & John F Kreider <i>Principles of Solar Engineering</i>, 4th edition, Taylor & Francis, 2022. 	
Course Outcomes	<p>Students will,</p> <ol style="list-style-type: none"> 1. Explain the importance of solar energy collection and storage 2. Apply the principles of wind energy and biomass energy. 3. Analyse knowledge on geothermal and ocean energy. 4. Learn about energy efficient systems. 5. Discuss the concepts of green manufacturing systems 	