Dr. Babasaheb Ambedkar Technological University
(Established as a University of Technology in the State of Maharashtra)
(Under Maharashtra Act No. XXIX of 2014)
P.O. Lonere, Dist. Raigad, Pin 402 103, Maharashtra
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Detailed Syllabus

of

Open Electives

In line with New Education Policy 2020

(Effective from Academic year 2025-26 for Affiliated Institutes only)

Open Electives

In the vertical of Multidisciplinary courses, students need to cover Open Elective Courses (OE) of 08 credits. These 08 credits over semesters III to V, which are included in the basic min.160-max.176 Credits.

It is offered in Second and/or Third year. Refer to Semester wise credit distribution table given below. Faculty-wise baskets of OE are prepared by University which are chosen from faculty other than that of the Major Faculty i.e. in this case Major Faculty is Faculty of Engineering. Other Faculties considered are as follows:

1. Faculty of Management and Commerce
2. Faculty of Law
3. Faculty of Humanities and Arts
4. Faculty of Architecture and Planning
5. Faculty of Health Sciences
6. Faculty of Science

Students need to take up three-four courses of 08 credits over semesters III to V.

Basic Semester wise credit distribution of the syllabus is as follows as per NEP-2020.

Semester		I	II	III	IV	V	VI	VII	VIII	Total Credits
Basic Science Course	BSC/ESC	06-08	08-10		--	--	--	--	--	14-18
Engineering Science Course		10-08	06-04		--	--	--	--	--	16-12
Programme Core Course (PCC)	Program Courses	--	02	08-10	08-10	10-12	08-10	04-06	04-06	44-56
Programme Elective Course (PEC)		--	--	--	--	04	08	02	06	20
Multidisciplinary Minor (MD M)	Multidisciplinary Courses		-	02	02	04	02	02	02	14
Open Elective (OE) Other than a particular program		--	--	04	02	02	--	--	--	08
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	02	02	--	02	--	02	--	--	08
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	02	--	--	02	--	--	--	--	04
Entrepreneurship/Economics/ Management Courses		--		02	02	--	--	--	--	04
Indian Knowledge System (IKS)			02		--	--	--	--	--	02
Value Education Course (VEC)		--	--	02	02	--	--	--	--	04
Research Methodology	Experiential Learning Courses	--	--	--	--	--	--		04	04
Comm. Engg. Project (CEP)/Field Project (FP)		--	--	02	--	--	--	-	-	02
Project		--	--	--	--	--	--		04	04
Internship/ OJT		--	---			--	--	12	-	12
Co-curricular Courses (CC)	Liberal Learning Courses	02	02		--	--	--	--	-	04
Total Credits (Major)		**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**160-176**

List of Open Electives for

Faculty of Management and Commerce

Sr. No.	Course Code	Course Name	Teaching Scheme	Duration (Weeks)	Credits	Institute Offering Course	Name of Professor/ Resource person	Link
1	25AF1MACOEM05A	Advanced Algorithmic Trading and Portfolio Management	4 Hrs/Week	8	2	IIT Kanpur	Prof. Abhinava Tripathi	https://nptel.ac.in/courses/110104169
2	25AF1MACOEM05B	Business Analytics & Text Mining Modeling using Python	4 Hrs/Week	8	2	IIT Roorkee	Prof. Gaurav Dixit	https://nptel.ac.in/courses/110107129
3	25AF1MACOEM05C	Commodity Derivatives & Risk Management	4 Hrs/Week	12	3	IIT Kharagpur	Prof. Prabina Rajib	https://nptel.ac.in/courses/110105168
4	25AF1MACOEM05D	E-Business	4 Hrs/Week	12	3	IIT Kharagpur	Prof. Mamata Jenamani	https://nptel.ac.in/courses/110105083
5	25AF1MACOEM05E	Econometric Modelling	4 Hrs/Week	8	2	IIT Roorkee	Prof. Sujata Kar	https://nptel.ac.in/courses/110107153
6	25AF1MACOEM05F	Introduction to Marketing Essentials	4 Hrs/Week	12	3	IIT Roorkee	Prof. Zillur Rahman	https://nptel.ac.in/courses/110107147
7	25AF1MACOEM05G	Security Analysis & Portfolio Management	4 Hrs/Week	12	3	IIT Roorkee	Prof. J. P. Singh	https://nptel.ac.in/courses/110107154
8	25AF1MACOEM05H	Equity Stock Market		6	3	Indian Institute of Management Bangalore (IIMB)	P C Narayan	
9	25AF1MACOEM05I	Total Quality Management	3 Hrs. / Week	7	3	IIT Kanpur	Prof. Raghunandan Sengupta,	https://archive.nptel.ac.in/courses/110/104/110104080/

10	25AF1MACOEM05J	Fundamentals of Digital Marketing & e-Commerce	2 Hrs. / Week	15	2	Panjab University Chandigarh	Dr.Tejinderpal Singh	https://onlinecourses.swayam2.ac.in/ugc19_hs26/preview
11	25AF1MACOEM05K	Corporate Communication	2 Hrs. / Week	6	2	Indian Institute of Management - Bangalore	Prof. Bringi Dev and Prof. Rakesh Godhwani	https://onlinecourses.swayam2.ac.in/imb19_mg14/
12	25AF1MACOEM05L	Basic Principle of Finance and Economy	2 Hrs. / Week	12	2	IIT Madras	Prof. Sabuj Kumar Mandal,	https://onlinecourses.nptel.ac.in/noc23_ec06
13	25AF1MACOEM05M	Marketing for entrepreneurship		6	3	Manipal University, Jaipur	Dr. D. Pushpa Gowri	https://onlinecourses.swayam2.ac.in/imb25_mg21/
14	25AF1MACOEM05N	Fundamentals of Financial Management		8	3	Savitribai Phule Pune University	Dr. Rupali Bipin Sheth	https://onlinecourses.swayam2.ac.in/cec25_mg06/preview
15	25AF1MACOEM05O	Innovations and Design Thinking			2			
16	25AF1MACOEM05P	Entrepreneurship Development			2			
17	25AF1MACOEM05Q	Entrepreneurship Skills and Digital Marketing Strategies		12	4	Uttarakhand Open University, Haldwani	Dr. Gagan Singh and Dr. Gopal Datt	Entrepreneurship Skills and Digital Marketing Strategies - Course

List of Open Electives for

Faculty of Law

Sr. No.	Course Code	Course Name	Teaching Scheme	Duration (Weeks)	Credits	Institute Offering Course	Name of Professor/ Resource person	Link
1	25AF1LAWOEM05A	Introduction to Law on Electricity	4 Hrs/Week	8	2	IIT Kharagpur	Prof. Uday Shankar	https://nptel.ac.in/courses/129105004
2	25AF1LAWOEM05B	New Labour Codes of India	4 Hrs/Week	12	3	IIT Kharagpur	Prof. KD Raju	https://nptel.ac.in/courses/129105006
3	25AF1LAWOEM05C	Right to Information and Good Governance	4 Hrs/Week	12	3	National Law School of India University	By Prof. Sairam Bhat	https://nptel.ac.in/courses/129106001
4	25AF1LAWOEM05D	Conflict Management through Mediation	4 Hrs/Week	8	2	Vice Chancellor, National University of Study and Research in Law, Ranchi (NUSRL)	Prof. (Dr.) Ashok R. Patil	https://nptel.ac.in/courses/129106008
5	25AF1LAWOEM05E	Biodiversity Protection, Farmers and Breeders	4 Hrs/Week	8	2	IIT Kharagpur	By Prof. Padmavati Manchikanti, Prof. Narendran Thiruthy |	https://nptel.ac.in/courses/129105008

		Rights						
6	25AF1LAWOEM05F	Introduction to Standards			2			

List of Open Electives for

Faculty of Humanities and Arts

Sr. No.	Course Code	Course Name	Teaching Scheme	Duration (Weeks)	Credits	Institute Offering Course	Name of Professor/ Resource person	Link
1	25AF1HAROEM05A	Developing Soft Skills and Personality	4 Hrs/Week	8	2	IIT Kanpur	Prof. T. Ravichandran	https://nptel.ac.in/courses/109104107
2	25AF1HAROEM05B	Folk and Minor Art in India	4 Hrs/Week	8	2	IIT Kanpur	Prof. Shatarupa Thakurta Roy	https://nptel.ac.in/courses/109104106
3	25AF1HAROEM05C	Sustainable Happiness	4 Hrs/Week	8	2	IIT Kharagpur	By Prof. Atasi Mohanty	https://nptel.ac.in/courses/109105493
4	25AF1HAROEM05D	Soft Skill Development	4 Hrs/Week	8	2	IIT Kharagpur	Prof. Priyadarshi Patnaik, Prof. V.N. Giri, Prof. D. Suar	https://nptel.ac.in/courses/109105110
5	25AF1HAROEM05E	Introduction to Market Structures	4 Hrs/Week	12	3	IIT Guwahati	Prof. Amarjyoti Mahanta	https://nptel.ac.in/courses/109103187
6	25AF1HAROEM05F	Human Resource Development	4 Hrs/Week	12	3	IIT Kharagpur	Prof. KBL Srivastava	https://nptel.ac.in/courses/109105121
7	25AF1HAROEM05G	Educational Leadership	4 Hrs/Week	12	3	IIT Kharagpur	Prof. Atasi Mohanty	https://nptel.ac.in/courses/109105122

8	25AF1HAROEM05H	Sustainable Development Goals	3 Hrs. / Week	12	3	Anna University	Dr. L. Suganthi	https://onlinecourses.swayam2.ac.in/cec22_hs37/preview
9	25AF1HAROEM05I	Gender & Violence	4 Hrs. / Week	15	5	Department of Teacher Training and Non-Formal Education, Jamia Millia Islamia	Dr. Naziya Hasan	https://onlinecourses.swayam2.ac.in/cec25_hs03/preview
10	25AF1HAROEM05J	German - I	3 Hrs. / Week	12	3	IIT Madras	Prof. Milind Brahme	https://onlinecourses.nptel.ac.in/noc25_hs121/preview
11	25AF1HAROEM05K	General Psychology	4 Hrs. / Week	12	5	Savitribai Phule Pune University, Pune	Dr. Shradha R. Sakatkar	https://onlinecourses.swayam2.ac.in/cec25_hs83/preview

List of Open Electives for

Faculty of Architecture and Planning

Sr. No.	Course Code	Course Name	Teaching Scheme	Duration (Weeks)	Credits	Institute Offering Course	Name of Professor/ Resource person	Link
1	25AF1ARPOEM05A	Architectural Approaches to Decarbonization of Buildings	4 Hrs/Week	12	3	School of Planning and Architecture, Vijayawada, An Institute of National Importance under the Ministry of Education, Govt. of India	Prof. Iyer Vijayalaxmi Kasinath	https://nptel.ac.in/courses/124106454
2	25AF1ARPOEM05B	Building Materials and Composites	4 Hrs/Week	8	2	IIT Kharagpur	Prof. Sumana Gupta	https://nptel.ac.in/courses/124105013
3	25AF1ARPOEM05C	Building Materials as a Cornerstone to	4 Hrs/Week	12	3	School of Planning and	Prof. Iyer Vijayalaxmi Kasinath	https://nptel.ac.in/courses/124106455

		Sustainability				Architecture, Vijayawada, An Institute of National Importance under the Ministry of Education, Govt. of India		
4	25AF1ARPOEM05D	Modern Indian Architecture	4 Hrs/Week	8	2	IIT Roorkee	Prof. P.S. Chani	https://nptel.ac.in/courses/124107161
5	25AF1ARPOEM05E	Sustainable Architecture	4 Hrs/Week	12	3	IIT Roorkee	Prof. Avlokita Agrawal	https://nptel.ac.in/courses/124107011
6	25AF1ARPOEM05F	Contemporary Architecture and Design	4 Hrs/Week	8	2	IIT Roorkee	Prof. Saptarshi Kolay	https://nptel.ac.in/courses/124107005
7	25AF1ARPOEM05G	Advanced Surveying			3			

List of Open Electives for

Faculty of Health Sciences

Sr. No.	Course Code	Course Name	Teaching Scheme	Duration (Weeks)	Credits	Institute Offering Course	Name of Professor/ Resource person	Link
1	25AF1HSCOEM05A	Basics of Health Promotion and Education Intervention	4 Hrs/Week	8	2	IIT Kharagpur	Dr. Arista Lahiri, Dr. Sweety Suman Jha, Prof. (Dr.) Chandrashekhar Taklikar, Prof.(Dr.) Madhumita Dobe	https://nptel.ac.in/courses/127105232
2	25AF1HSCOEM05B	Research Methods in Health Promotion	4 Hrs/Week	12	3	IIT Kharagpur	Dr. Arista Lahiri, Dr. Sweety Suman Jha, Prof.(Dr.) Madhumita Dobe	https://nptel.ac.in/courses/127105237
3	25AF1HSCOEM05C	Introduction to Psychology	3 Hrs. / Week	8	3	IIT Kanpur	Prof. Braj Bhushan	https://onlinecourses.nptel.ac.in/noc21_hs49

List of Open Electives for

Faculty of Science

Sr. No.	Course Code	Course Name	Teaching Scheme	Duration (Weeks)	Credits	Institute Offering Course	Name of Professor/ Resource person	Link
1	25AF1SCIOEM05A	Quantum Computing	4Hrs/Week	12	3	IIT Kanpur	Prof. Debabrata Goswami	https://onlinecourses.nptel.ac.in/noc19_cy31/preview#:~:text=Building%20up%20on%20the%20digital,the%20laws%20of%20quantum%20mechanics.
2	25AF1SCIOEM05B	Introduction to Quantum Computing: Quantum Algorithms and Qiskit	4Hrs/Week	4	1	IIT Madras, IBM Research, IBM Systems	Prof. Prabha Mandayam, Prof. Anupama Ray, Prof. Sheshashayee Raghunathan	https://onlinecourses.nptel.ac.in/noc24_cs67/preview
3	25AF1SCIOEM05C	Quantum Information and Computing	4Hrs/Week	8	2	IIT Bombay	Prof.Dipan Ghosh Department of Physics	https://archive.nptel.ac.in/courses/115/101/115101092/
4	25AF1SCIOEM05D	Dynamics	4Hrs/Week	12	3	IIT Guwahati	Prof. Girish S. Setlur	https://onlinecourses.nptel.ac.in/n

		of Classical and Quantum Fields						oc22_ph29/preview
5	25AF1SCIOEM05E	Introduction to MATLAB	3 Hrs. / Week	8	3	IIT Roorkee	Prof. Yogesh Vijay Hote	https://onlinecourses.nptel.ac.in/noc19_ee45/
6	25AF1SCIOEM05F	CO2 Capture, Sequestration and Utilization	2 Hrs. / Week	12	2	IIT Kanpur	Prof. Deepu Philip, Prof. Amandeep Singh Oberoi, Prof. Prabal Pratap Singh ,	https://onlinecourses.nptel.ac.in/noc24_ge49/
7	25AF1SCIOEM05G	Waste to Energy	2 Hrs. / Week	8	2	IIT Roorkee	Prof. P. Mondal	https://onlinecourses.nptel.ac.in/noc20_ch16
8	25AF1SCIOEM05H	History of Science &Technology	3 Hrs. / Week	16	3	UGC-HRDC, Jawaharlal Nehru University New Delhi	Prof. Madhav Govind	https://onlinecourses.swayam2.ac.in/arp19_ap87
9	25AF1SCIOEM05I	Algebra I		15	5	Pondicherry University	Dr.T.Asir	https://onlinecourses.swayam2.ac.in/cec25_ma01/
10	25AF1SCIOEM05J	Numerical Methods in Engineering			2			
11	25AF1SCIOEM05K	Biology for Engineers			2			
12	25AF1SCIOEM05L	Numerical Methods			2			

List of Open Electives for

Faculty of Emerging Technologies

Sr. No.	Course Code	Course Name	Teaching Scheme	Duration (Weeks)	Credits	Institute Offering Course	Name of Professor/ Resource person	Link
1	25AF1OTHOEM05A	Introduction to Automation			2			

Detailed syllabus for Open Elective Courses in

Faculty of Management and Commerce

Advanced Algorithmic Trading and Portfolio Management

Week 1: Introduction to R Programming, R Fundamentals, Basic mathematical and logical operations with R, working with different data-types in R, wrangling with dataframes, Exploratory data analysis and data visualization with R.

Week 2: Introduction to Portfolio Construction : Risk-return framework in financial markets, risk diversification with portfolios, portfolio optimization in mean-variance framework, concept of market risk and beta, Portfolio Possibility curve, Efficient frontier, Minimum Variance portfolios, Introduction to risk-free lending and borrowing

Week 3: Asset Pricing Models: Capital Asset Pricing Model (CAPM), Capital Market Line, Security Market Line, Fallings of CAPM, Single-Index and Multi-Index models, Expected Risk and Return with Index models, 3-Factor Fama-French Model

Week 4: Portfolio Management and Performance Evaluation: Portfolio Management strategies, Active vs Passive Portfolio Management, Value vs Growth investing, One-parameter performance measures Timing & Selection performance measures, application of asset pricing models in performance management

Week 5: Introduction to Algorithmic Trading: Technical analysis and trend determination, Dow Theory, Moving averages, Momentum indicators, Classical price patterns.

Week 6: Advanced time-series regression algorithms: ARMA/ARIMA models, Mean reverting trading strategies with vector error correction models and cointegration, model risk management, back testing, model validation, and stress testing with R

Week 7: Advanced time-series algorithms for financial risk-management: Value-at-risk, Expected Shortfall, ARCH/GARCH models, implementation with R

Week 8: Advanced topics: Alternative versions of CAPM, Delineating Efficient Frontier, Performance Evaluation with Multi-index models, Portfolio construction, optimization, back-testing, and visualization with R

Business Analytics & Text Mining Modeling using Python

Week 1: Introductory overview of Text Mining

- Introductory Thoughts
- Data Mining vs. Text Mining

- Text Mining and Text Characteristics
- Predictive Text Analytics
- Text Mining Problems
- Prediction & Evaluation
- Python as a Data Science Platform

Python for Analytics

- Introduction to Python Installation
- Jupyter Notebook Introduction

Week 2: Python Basics

- Python Programming Features
- Commands for common tasks and control
- Essential Python programming concepts & language mechanics

Built in Capabilities of Python

- Data structures: tuples, lists, dicts, and sets

Week 3: Built in Capabilities of Python

- Functions, Namespaces, Scope, Local functions, Writing more reusable generic functions

Week 4: Built in Capabilities of Python

- Generators
- Errors & Exception Handling
- Working with files

Numerical Python

- N-dimensional array objects

Week 5: Numerical Python

- Vectorized array operations
- File management using arrays
- Linear algebra operations
- Pseudo-random number generation
- Random walks

Python pandas

- Data structures: Series and DataFrame

Week 6: Python pandas

- Applying functions and methods
- Descriptive Statistics
- Correlation and Covariance

Working with Data in Python

- Working with CSV, EXCEL files
- Working with Web APIs

Week 7: Working with Data in Python

- Filtering out missing data, Filling in the missing data, removing duplicates

- Perform transformations based on mappings
- Binning continuous variables
- Random sampling and random reordering of rows
- Dummy variables
- String and text processing
- Regular expressions
- Categorical type

Data Visualization using Python

- Matplotlib Library
- Plots & Subplots

Week 8: Text mining modeling using NLTK

- Text Corpus
- Sentence Tokenization
- Word Tokenization
- Removing special Characters
- Expanding contractions
- Removing Stopwords
- Correcting words: repeated characters
- Stemming & lemmatization
- Part of Speech Tagging
- Feature Extraction
- Bag of words model
- TF-IDF model
- Text classification problem
- Building a classifier using support vector machine

Commodity Derivatives & Risk Management

Week 1: Commodity Derivatives Trading & Commodity Exchanges, Commodity Contracts, Trading platform for Major Commodity Exchanges: Open Outcry vs. Electronics. Kerb Trading.

Week 2: Commodity Indices creation, Collateralized vs. uncollateralized index, commodity index based on contract side.

Week 3: Introduction to Futures & Forwards, Pricing & valuation, Futures Pricing Valuation for Storable/non Storable Commodity.

Week 4: Contango/Backwardation, Hedge Ratio, Pricing & Valuation of Commodity Options.

Week 5: Introduction to Options, Swaps, Exchange of Futures for Physicals, Pricing & Valuation.

Week 6: Commodity Price risk for Agricultural committee, Seasonality in prices, Contango, backwardation

Week 7: Commodity Price risk in Crude Oil & Natural Gas, LOOP Storage contracts

Week 8: Gold & Silver, Base Metal Commodity Derivatives.

Week 9: Electricity Derivatives Pricing and Trading.

Week 10: Carbon Credit Derivatives, Pricing & Trading.

Week 11: Weather Derivatives.

Week 12: Miscellaneous Derivatives: Freight, Water, Property and Non-Farm Payroll Index, Salmon, Bitcoin Derivatives.

E-Business

Week 1: Introduction to E-Business

Week 2: Making Functional Areas E-Business Enabled : Value chain and supply chain, inter and intra organizational business processes, ERP.

Week 3: Making Functional Areas E-Business Enabled : E-Procurement.

Week 4: Making Functional Areas E-Business Enabled : E-marketing, E-Selling, E-Supply Chain Management.

Week 5: Technologies for E-Business: Internet and Web based system.

Week 6: Technologies for E-Business: Security and payment systems.

Week 7: Technologies for E-Business: Supply chain integration technologies (EDI, RFID, Sensors, IoT, GPS, GIS).

Week 8: Technologies for E-Business: Supply chain integration technologies (Web services and cloud).

Week 9: Decision Support in E-Business: Web analytics.

Week 10: Decision Support in E-Business: Customer behavior modeling.

Week 11: Decision Support in E-Business: Auctions.

Week 12: Decision Support in E-Business: Recommender systems.

Econometric Modelling

Week 1 : Introduction
Week 2 : Overview of Classical Linear Regression Model
Week 3 : Multiple regression analysis and diagnostic tests

Week 4 : Statistical inference and hypothesis testing
Week 5 : Univariate Time Series Modelling
Week 6 : Models with Binary Dependent and Independent Variables
Week 7 : Multivariate Models
Week 8 : Modelling Long Run Relationships

Introduction to Marketing Essentials

Week 1: Creating Customer Relationships and Value Through Marketing, TheNew Realities of Marketing, Developing Successful Marketing and Organizational Strategies.

Week 2: Organizing and Managing the Marketing Department, Developing a Marketing Strategy,Understanding the Marketing Environment, Ethical Behavior, and Social Responsibility, Understanding Consumer Behavior.

Week 3: Understanding Consumer Behavior (Continued), Understanding Organizations as Customers.

Week 4: Understanding and Reaching Global Consumers and Markets, Marketing Research: From Customer Insights to Actions.

Week 5: Market Segmentation, Targeting, and Positioning, Crafting Customer Value Proposition, Sustainable Competitive Advantage and Communicating Positioning.

Week 6: Developing New Products and Services

Week 7: Developing New Products and Services(Continued), Managing Successful Products, Services, and Brands.

Week 8: Managing Successful Products, Services, and Brands (Continued), Pricing Products and Services.

Week 9: Managing Marketing Channels and Supply Chains, Retailing and Wholesaling.

Week 10: Integrated Marketing Communications and Direct Marketing, Advertising, Sales Promotion, and Public Relations, Using Social-Media to Connect with Consumers.

Week 11: Using Social-Media to Connect with Consumers (Continued), Personal Selling and Sales Management, Implementing Interactive and Multichannel Marketing.

Week 12: Managing Growth: Addressing Competition and Driving Growth, Building Customer Loyalty, Socially Responsible Marketing.

Security Analysis & Portfolio Management

Week 1: Concept of Investment, Investment Objectives and Constraints, Investment Classification. Financial Markets & Instruments, their role & classification. Regulation of Securities Markets, Primary & Secondary Markets, Trading, Clearing and Settlement procedures, Market Indices.

Week 2: Concept & Measures of Risk and Return, Portfolio Risk & Return, Reduction of Risk through Diversification.

Week 3: Concept of Intrinsic Valuation, Cash Flow based Equity Stock Valuation Models. Value Added & Asset based valuation. Use of Multiples & Relative Value.

Week 4: Fundamental Analysis for Determination of Inputs to Equity Valuation, Cash Flow & Profitability Forecasting, EIC Framework, Economic Forecasting Methods, Industry Analysis, Industry Life Cycle, Structural Analysis.

Week 5: Company Analysis, Publicly accessible Corporate Information, Tools of Financial Statement Analysis.

Week 6: Financial Statement Analysis including Impact of Changes in Accounting Policies, Depreciation Methods, Revaluation of Fixed Assets, Foreign Exchange Transactions, Amortization of Preliminary and Preoperative Expenses, R&D Expenditure, Valuation of Inventory, Treatment of Leases etc.

Week 7: Measures of Bond Returns, YTM & Holding Period Yields, Bond Valuation, Spot & Forward Interest Rates, Term Structure & Yield Curves, Interest Rate Sensitivities, Duration & Elasticities. Key Rates & Bucket Rates.

Week 8: Efficient Market Hypothesis, Technical Analysis: Dow Theory, Types of Charts, Price Patterns, Trend Lines, Trend Channels, Support and Resistance Levels, Relative Strength Analysis, Moving Averages, Breadth of the Market, Volume, Momentum.

Week 9: Portfolio optimization in the mean variance framework: two security case, various combinations of risky & risk-free assets, implications of the results, concept of efficient frontier. Concept of Utility & Indifference Curves, Optimal Portfolio Selection.

Week 10: The multi-security case of portfolio optimization, Tracing of the full efficient frontier with/without the existence of risk-free asset.

Week 11: Single Index & Capital Asset Pricing Model, Systematic and Unsystematic Risk, Beta of a Portfolio, CML & SML, Arbitrage Pricing Theory, Comparison of CAPM and APT, Applications of APT.

Week 12: Active & Passive Portfolio Management, Portfolio Revision of Equity Portfolios, Measuring and Evaluating Portfolio Performance, Measures of Return on Active Portfolios, Buying the Index Approach. Fixed Income Portfolio Management. Active vs Passive Strategies, Portfolio Management Using Derivatives.

Equity Stock Market

Week 1: Overview of Equity Stock Markets

- Overview and Planner for Week 1
- Financial Markets: An Overview
- Equity Stock Market: An Overview
- Estimating the Price of Equity Stocks
- Equity Stock Market: Market Mechanism
- Equity Stock Market: Indices and Regulatory Mechanism
- Summary and Additional Reading

Week 2: Underlying Theories Governing Equity Stock Markets

- Overview and Planner for Week 2
- Fundamental Analysis
- Technical Analysis
- Fundamental vs. Technical Analysis
- Moving Averages
- Dow Theory
- Elliot Wave Theory
- Summary and Additional Readings

Week 3: Equity Risk and PortfolioTheories

- Overview and Planner for Week 3
- EquityRisk : An Overview
- Introduction to Portfolio Theory
- Portfolio Theory - CAL and CML
- Portfolio Theory - SML and CAPM
- Evaluating Equity Portfolio using Sharpe Ratio, Treynor Ratio andJensen's Alpha

- Summary and Additional Readings

Week 4: Hedging Using Derivatives in Equity Stock Markets

- Overview and Planner for Week 4
- Derivatives in Equity Market
- Hedging Using Stock Futures
- Hedging Using Index Futures
- Hedging Using a Single Option
- Multiple Options and Trading
- Strategies
- Summary and Additional Readings

Week 5: VaR, Margins, Private EquityMarket and Venture Capital

- Overview and Planner for Week 5
- VaR (Value at Risk)
- Computing and Enforcing Margins
- Private Equity Market
- Venture Capital
- Summary and Additional Readings

(1) Total Quality Management **03 Credits**

Category Faculty of Management and Commerce									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	Total Quality Management	**3**	**-**	**-**	**20**	**20**	**60**	**100**	**03**
NPTEL Link https://archive.nptel.ac.in/courses/110/104/110104080/									

Course Objectives:

1. To understand the concept of Quality in Manufacturing and Service units
2. To understand the Implication of Quality in Business
3. To understand how to implement Quality Programs in an Organization
4. To have exposure to challenges in Quality Improvement Programs

Course Outcomes:

Upon successful completion of the course, the students will be able to

CO1: Identify the significance of quality in an organization
CO2: Describe how to manage quality improvement teams
CO3: Apply the tools of quality improvement programs in an organization
CO4: Assess the benefits of implementing TQM Program in an organization

Detailed Syllabus:

Unit I

Introduction: Evolution of Quality, Historical Perspectives, Relationship among Quality, Vision, Mission and Objectives of an Organization, Role of Quality in a Corporate Structure of an Organization, Attributes of Product and Service Quality, Quality Characteristics: Quality of Design, Quality of Performance and Quality of Conformance, Zero Defect and Continuous Improvement.

Unit II

Conceptualization of TQM: Introduction to Total Quality Management (TQM), Barriers to TQM, Benefits of TQM implementation, Basic Approaches of TQM, TQM Models, Quality Information System and Planning, Importance of TQM in manufacturing and Service Industry.

Unit III

Organization Structure in TQM: Role of Top Management, Quality Council, Quality Circles, Organization Structure for Quality Circles, Quality Policies, Role of Middle and Lower Management, Problem Solving Techniques.

Unit IV

Tools and Systems for Quality Management: Basic Tools: Cause & Effect Diagram, Flow Diagrams, Trend Charts, Histogram, Scatter Diagram, Control Chart

Advanced Tools: Affinity Diagram, Inter Relationship Diagram, Tree Diagram, Matrix Diagram, Process Decision Program Chart (PDPC) and Matrix Data Analysis, Fault Tree Analysis

Quality Function Deployment (QFD):Definition and Phases in QFD , Taguchi Approach To Quality System Design

Six-sigma :Definition & Implementation Steps, Just in Time Production System, Quality Production through JIT and Kanban, Failure Mode and Effect Analysis (FMEA): Scope, Mode, Illustrative Example and Applications.

Unit V

Quality Assurance: Causes of Quality Failure, Quality Assurance: Need and Various Elements in Quality Assurance Programme, Quality Control- on Line and off Line, Statistical Concepts in Quality, Chance and Assignable Causes, Bench Making in Quality Management.

Implementation and Need of ISO 9000: ISO 9000 – 2000 Quality System: Elements, Registration, Documentation, Implemental Steps, Quality Audit, Product and Process Audit: Scope, Steps and Benefits.

Books and References:

1. Total Quality Management by Dale H Bersterfilled, PHI Publication.
2. Total Quality Management by N.V.R Naidu, G. Rajendra, New Age International Publication.
3. Total Quality Management by L. Sugandhi and Samuel Anand, PHI Publication.
4. Total Quality Management by R.S Naagarazan, New Age International Publication.

(2) Fundamentals of Digital Marketing & e-Commerce 02 Credits

Category Faculty of Management and Commerce									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	Fundamentals of Digital Marketing & e-Commerce	**2**	**-**	**-**	**20**	**20**	**60**	**100**	**02**
NPTEL Link https://onlinecourses.swayam2.ac.in/ugc19_hs26/preview									

Course Outcomes

The course familiarize students with an understanding of how the digital media works and develop the critical insights necessary to succeed in e-commerce and digital and social media marketing. Enrich learner with the essential principles and practices of marketing in the digital economy by making this course, an indispensable part of their knowledge base.

Detailed Syllabus

Unit I
Introduction to Marketing, Consumer Behavior, Introduction to Digital Marketing
Search Engine Optimization

Unit II
Search Engine Marketing, Display Advertising, Social Media Marketing (Word of Mouth), Social Media Platforms

Unit III
Online Reputation Management, Mobile Marketing, Website Planning & Creation, Email Marketing.

Unit IV
Introduction to E Commerce, E-COMMERCE Strategy, Content Marketing, Content Creation Process, Influencer Marketing

Unit V
Digital Marketing Strategies, Digital Analytics & Measurements, Digital Marketing Plan; Case Studies, Measuring Campaign Effectiveness, New Technologies & Advancement in Digital Marketing.

(3) Corporate Communication 02 Credits

Category Faculty of Management and Commerce									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	Corporate Communication	**2**	**-**	**-**	**20**	**20**	**60**	**100**	**02**
NPTEL Link https://onlinecourses.swayam2.ac.in/imb19_mg14/									

Course Outcomes:

At the end of the course, the student will be able to:

CO1: Understand corporate communication culture
CO2: Prepare business letters, memos and reports
CO3: Communicate effectively in formal business situations
CO4: Exhibit corporate social responsibility and ethics
CO5: Practice corporate email, mobile and telephone etiquette
CO6: Develop good listening skills and leadership qualities

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1									✓	✓	✓	
CO2									✓	✓	✓	
CO3									✓	✓	✓	
CO4									✓	✓	✓	
CO5									✓	✓	✓	
CO6									✓	✓	✓	

Detailed Syllabus:

Unit I
Importance of Corporate communication: Introduction to and definition of corporates – Communication, process, patterns and channels of communication- Barriers to communication and strategies to overcome them- Evolution of corporate culture- Role and contribution of individual group and organization - Role of psychology in communication.

Unit II
Oral Communication: Techniques for improving oral fluency-Speech mechanics- Group Dynamics and Group Discussion – Debate and oral presentations.

Unit III
Written Communication: Types and purposes- Writing business reports, and business proposals-Memos, minutes of meetings- Circulars, persuasive letters- Letters of complaint- ; language and formats used for drafting different forms of communication. Internal and external communication.

Unit IV
Corporate responsibility: Circulating to employees' vision and mission statements- ethical practices- Human rights -Labour rights-Environment- governance- Moral and ethical debates surrounding -Public Relations - Building trust with stakeholders.

Corporate Ethics and Business Etiquette: Integrity in communication-Harmful practices and communication breakdown- Teaching how to deal with tough clients through soft skills. Body language- Grooming- Introducing oneself- Use of polite language- Avoiding grapevine and card pushing – Etiquette in e-mail, mobile and telephone.

Unit V

Listening Skills: Listening- for information and content- Kinds of listening- Factors affecting listening and techniques to overcome them- retention of facts, data and figures- Role of speaker in listening.
Leadership Communication Styles: Business leadership -Aspects of leadership- qualities of leader- training for leadership-delegation of powers and ways to do it-humour- commitment.

Texts and Reference Books

1. Raymond V. Lesikar, John D. Pettit, Marie E. Flatley Lesikar's Basic Business Communication - 7th Edition: Irwin, 1993
2. Krishna Mohan and Meera Banerji, Developing Communication Skills: Macmillan Publishers India, 2000
3. R.C. Sharma & Krishna Mohan Business Correspondence and Report Writing: – 3rd Edition Tata McGraw-Hill, 2008
4. Antony Jay & Ross Jay, Effective Presentation, University Press, 1999.

Shirley Taylor, Communication for Business, Longman, 1999

(4) Basic Principle of Finance and Economy 02 Credits

Category Faculty of Management and Commerce									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	Basic Principle of Finance and Economy	**2**	**-**	**-**	**20**	**20**	**60**	**100**	**02**
NPTEL Link https://onlinecourses.nptel.ac.in/noc23_ec06									

Course Outcomes:

Students will be able to:

1. Students will be able to know and apply accounting and finance theory.
2. Students will be able to understand the mechanics of preparation of financial statements, their analysis and interpretation
3. Students will be able to explain basic economic terms, concepts, and theories
4. Students will be able to identify key macroeconomic indicators

Detailed syllabus:

Unit I
Introduction: Explaining the Economy. The Supply and Demand Model Using the Supply and Demand Model
The Competitive Equilibrium Model: Deriving Demand Deriving Supply, Market Equilibrium and Efficiency

Unit II
Deviations from Competition: Monopoly and Market Power between Monopoly and Competition Antitrust Policy and Regulation

Unit III
Macro facts and measures: Getting Started with Macroeconomic Ideas, Measuring Production, Income and Spending of Nations

Unit IV
Accounting Transaction: Journal entries Debit credit rules, Compound journal entry Journal and ledger Rules of posting entries Trial balance

Unit V
Capital and Revenue: Income and expenditure Expired costs and income Final accounts, Manufacturing accounts Trading accounts, Profit and Loss account Suspense account, Balance sheet, Concept of Depreciation.

Marketing Management

Week 1: Introduction to Marketing
Week 2: Segmentation and Targeting
Week 3: Differentiation and Positioning
Week 4: Consumer Behavior
Week 5: B2B Marketing and Marketing Strategy (Product Decisions)
Week 6: Marketing Strategy (Product, Service and Pricing Decisions)
Week 7: Marketing Strategy (Place Decisions)
Week 8: Marketing Strategy (Promotion) and Product Life Cycle"

Detailed syllabus for Open Elective Courses in Faculty of Law

Introduction to Law on Electricity

Week 1 : Introduction of the Electricity Law; Constitutional Design; Brief Description of Pre-2003 Act and Post - 2003 Act
Week 2 : Energy Security and Energy Mix and the Role of the Electricity Act; Relevance of National Electricity and Tariff Policies.
Week 3 : De-licensing of Generation and Captive Power Plant
Week 4 : Transmission and Load Dispatch Centre
Week 5 : Open Access and Tariff
Week 6 : Trading of Electricity and Trading Market
Week 7 : Distribution and Universal Service Obligation
Week 8 : Interest of Consumer and Redressal of the Grievances; Renewable Energy and 2003 Act including Renewable Purchase Obligations; Net and Gross Metering.

New Labour Codes of India

Week 1:
1. Introduction

2. Government Policies
3. History of Labour Laws in the Country
4. History: Previous Social Legislations in India (Cont…)
5. National Labour Commission Reports

Week 2:
6. Evolution of Trade Unions in India
7. Constitutional Freedom to Form Association and Unions
8. International Labour Organization on Trade Unions
9. Trade Union – Definition, Registration, Cancellation, Management of Funds
10. Trade Union – Recognition, Immunities

Week 3:
11. Industrial Dispute – Introduction, Definitions
12. Resolution of Industrial Disputes
13. Concept of Workmen, Contract of service, Contract for service
14. Strike
15. Lock-out

Week 4:
16. Lay-Off
17. Retrenchment
18. Closure of Undertakings
19. Industrial Employment (Standing Orders)
20. Disciplinary Action and Procedures

Week 5:
21. The Code on Wages 2019 – An Introduction
22. Minimum Wages, Floor Wages, Central and State Advisory Board
23. Payment of Wages, Deductions & Recovery, Fines
24. Equal Remuneration
25. Bonus

Week 6:
26.C131: Minimum Wage Fixing Convention, 1970
27.C026: Minimum Wage – Fixing Machinery Convention, 1928; C099: Minimum Wage Fixing Machinery (Agriculture) Convention, 1951
28.C095: Protection of Wages Convention, 1949
29.C100: Equal Remuneration Convention, 1951: International Instruments on Equality of Pay
30.C173: Protection of Workers' Claims (Employer's Insolvency) Convention, 1992; C111: Discrimination (Employment and Occupation) Convention, 1992

Week 7:
31. Code on Social Security, 2020 – Introduction
32. Definitions under Social Security Code, 2020

33. Social Security Organizations (SSO)
34. Employee's Compensation and Benefits
35. The Concept of arising out of and in the course of employment

Week 8:
36. Employees State Insurance
37. Different Benefits under the ESI Scheme
38. Employee's Provident Fund
39. Gratuity
40. Maternity Benefit

Week 9:
41. Social Security in case of Building and other Construction Workers
42. Social Security for Unorganized sector and Platform workers
43. Bonded Labour System Abolition and Regulation
44. Child Labour Prohibition
45. Plantation Labour

Week 10:
46. Occupational Safety, Health and Working Conditions Code, 2020 – Introduction, Definitions
47. Occupational Safety and Health
48. Health Safety and Working Conditions, Welfare Provisions
49. Regulation of Working H ours and the Concept of Decent Work
50. Duties of Employer and Employees, Special Provisions relating to Employment of Women, Hours of Works, Annual Leave with Wages, Maintenance of Registers

Week 11:
51. The Meaning of Factory, Manufacturing Process, Approval and Licensing of Factories
52. Role of Inspector-cum-facilitator and Other Authorities
53. Social Security Fund, Offences and Penalties
54. Contract Labour and Proposed ILO Convention
55. Inter-State Migrant Workers

Week 12:
56. Mines Workers
57. Beedi and Cigar Workers (Kerala & West Bengal Legislations)
58. Audio-Visual workers, Cine-workers and Dock workers
59. The Effective Abolition of Child Labour (ILO: C029, C105, C138 & C182)
60. The Governance Convention of ILO Labour Standards

Right to Information and Good Governance

Week 1: History and Background to RTI

Week 2:

- Legislating RTI
- Official Secrets Act and RTI
- Role of NGOs and activist in RTI
- Mis-use of RTI
- Important SC and HC judgments in RTI

Week 3: Constitution and RTI
Week 4: Salient Features of RTI-1
Week 5: Salient features of RTI-2
Week 6: Powers and Functions of Information Commission
Week 7: Public Authority
Week 8: Exempted Information
Week 9: RTI & Its interface

- Public Records Act
- Whistleblowers Protection Act
- Judiciary and RTI

Week 10:

- Ecological perspective on RTI
- Lessons from RTI: Sakaala: Public Service Guarantee Act

Week 11: RTI: A comparative perspective

- Comparative Constitutional and Comparative FOI regime
- RTI in Srilanka

Week 12: How to Draft RTI Application and Appeals: Do it yourself

Conflict Management through Mediation

Week 1: Introduction
- Basic Introduction
- Historical Perspective and Evolution in India
- Legal Recognition of Mediation in India
- Conflict and Conflict Management
(Relevant Case Laws)

Week 2: Concept of Mediation
- Basic Principles of Mediation
- Types of Mediation
- Advantages of Mediation
(Relevant Case Laws)

Week 3: Comparison of Judicial Process and Various ADR Processes
- A comparative Analysis of Judicial Process with modes of Alternate Dispute Resolution like Arbitration, Mediation, Conciliation, Negotiation and Lok Adalats.
- Illustrations to understand the difference and identify suitable conditions for ADR.

Week 4: Process of Mediation
- Pre-litigation Mediation
- Post-litigation Mediation
- Stages of Mediation
- Challenges
- The Mediation Act, 2023
(Relevant Case Laws)

Week 5: Mediators
- Role of Mediators
- Ethics
- Communication in Mediation
(Relevant Case Laws)

Week 6: Mediation under Consumer Protection Act, 2019
- Introduction of the Mediation under Consumer Protection Act, 2019
- Chapter V- Mediation
- Consumer Protection (Mediation) Rules, 2020
- Consumer Protection (Mediation) Regulations, 2020 (Relevant Case Laws)

Week 7: Mediation under other related laws
- Mediation under the Commercial Courts, 2015, Family Court Act, 1984, the Banking Ombudsman Scheme, 2006 and the Companies Act, 2013
- United Nations Convention on International Settlement Agreements Resulting from Mediation, 2018 (the "Singapore Convention on Mediation")
- Online Mediation including ODR Report
- ODR Policy of NITI Aayog (Relevant Case Laws)

Week 8: Drafting and Enforcement
- Enforcement of Mediation Outcome
- Drafting Mediation Settlement

Biodiversity Protection, Farmers and Breeders Rights

Week 1: Concept and Scope of biodiversity protection
1. Concept and Scope of biodiversity protection
2. Types of biodiversity, mega-biodiverse centers,
3. Type of bio-resources, conservation mechanisms
4. International resources/centers of conservation
5. Traditional Resource rights, ecosystem measures

Week 2: Protection of Biological diversity: International mandate

1. Overview of International framework
2. Convention on Biodiversity - Objectives and Articles
3. International Regime on ABS
4. Biodiversity and Climate Change
5. Biobanks – Governance issues

Week 3: Protection of Biological Diversity -Indian position
1. The Biological Diversity Act, 2002
2. Regulatory authorities in India – NBA & SBB
3. Biodiversity Management Committees
4. People Biodiversity Registers
5. ABS Regulation and Benefit Sharing Procedures in India

Week 4: CBD, TRIPS and other treaties relevant to biodiversity protection – Interrelationship and Developments
1. Trade regime and Biodiversity
2. Comparison of Biodiversity Laws of countries
3. TRIPS-CBD relation
4. CBD and relation to other international treaties related to environment and organization of related bodies
5. Interrelationship and new Developments

Week 5: Biodiversity and Intellectual Property Rights
1. Biodiversity and Interface with IPR
2. Challenges related to Bio piracy - Case Studies
3. Patenting Biodiversity – Recent trends and Developments
4. Disclosure Requirements in Patent – Comparative Perspective
5. Regulatory Law – Comparative Perspective

Week 6: Plant Breeding and breeders' right v the farmers' right
1. Concept, Definitions and Criteria for Plant Variety Protection.
2. Protection of Plant Varieties and Farmers' Right 2001 - Major provisions of the Act
3. Plant Variety protection in US, EU, Japan, China etc.,
4. International Union for protection of new plant varieties (UPOV)
5. Farmers' Rights – other country models

Week 7: Biodiversity Governance and Compliance Procedures – Comparative Perspective
1. Principles of Biodiversity Governance
2. Compliance Procedures and Linkage with IPR
3. Compliance Procedures under International Framework
4. Compliance Procedures in India
5. Compliance Procedures in EU

Week 8: Biodiversity and Human Wellbeing
1. Biodiversity and Interrelationship with Life
2. Sustainable Development Agenda

3. Biodiversity, ecosystem functioning, ecosystem services
4. Biodiversity and Human Happiness
5. Nature Protects if She is Protected

Detailed syllabus for Open Elective Courses in

Faculty of Humanities and Arts

Developing Soft Skills and Personality

Week 1: Lecture 1: Introduction: A New Approach To Learning
Lecture 2: Planning and Goal-Setting
Lecture 3: Human Perceptions: Understanding People
Lecture 4: Types Of Soft Skills: Self-Management Skills
Lecture 5: Aiming For Excellence: Developing Potential And Self-Actualisation
Lecture 6: Need Achievement and Spiritual Intelligence

Week 2: Lecture 7: Conflict Resolution Skills: Seeking Win-Win Solution
Lecture 8: Inter-Personal Conflicts: Two Examples
Lecture 9: Inter-Personal Conflicts: Two Solutions
Lecture 10: Types Of Conflicts: Becoming A Conflict Resolution Expert
Lecture 11: Types Of Stress: Self-Awareness About Stress
Lecture 12: Regulating Stress: Making The Best Out Of Stress

Week 3: Lecture 13: Habits: Guiding Principles
Lecture 14: Habits: Identifying Good and Bad Habits
Lecture 15: Habits: Habit Cycle
Lecture 16: Breaking Bad Habits
Lecture 17: Using The Zeigarnik Effect For Productivity And Personal Growth
Lecture 18: Forming Habits Of Success

Week 4: Lecture 19: Communication: Significance Of Listening
Lecture 20:Communication: Active Listening
Lecture 21:Communication: Barriers To Active Listening
Lecture 22:Telephone Communication: Basic Telephone Skills
Lecture 23:Telephone Communication: Advanced Telephone Skills
Lecture 24: Telephone Communication: Essential Telephone Skills

Week 5: Lecture 25: Technology And Communication: Technological Personality
Lecture 26: Technology And Communication: Mobile Personality?
Lecture 27: Topic: Technology And Communication: E-Mail Principles
Lecture 28: Technology And Communication: How Not To Send E-Mails!
Lecture 29: Technology And Communication: Netiquette
Lecture 30: Technology And Communication: E-Mail Etiquette

Week 6: Lecture 31: Communication Skills: Effective Communication
Lecture 32: Barriers To Communication: Arising Out Of Sender/Receiver's Personality
Lecture 33: Barriers To Communication: Interpersonal Transactions
Lecture 34: Barriers To Communication: Miscommunication
Lecture 35: Non-Verbal Communication: Pre-Thinking Assessment-1
Lecture 36: Non-Verbal Communication: Pre-Thinking Assessment-2

Week 7: Lecture 37: Nonverbal Communication: Introduction And Importance
Lecture 38: Non-Verbal Communication: Issues And Types
Lecture 39: Non-Verbal Communication: Basics And Universals
Lecture 40: Non-Verbal Communication: Interpreting Non-Verbal Cues
Lecture 41: Body Language: For Interviews
Lecture 42: Body Language: For Group Discussions

Week 8: Lecture 43: Presentation Skills: Overcoming Fear
Lecture 44: Presentation Skills: Becoming A Professional
Lecture 45: Presentation Skills: The Role Of Body Language
Lecture 46: Presentation Skills: Using Visuals
Lecture 47: Reading Skills: Effective Reading
Lecture 48: Human Relations: Developing Trust And Integrity

Folk and Minor Art in india

Week 1: Changing definition of Folk and Minor Art
Timeline and Regions: General Mapping
Traditional Roots: Elements and Principles
Timelessness : Primitive Connection
Evolution in Purpose: Ritualistic to Propagative
Contemporary Practice

Week 2: Classification and Connections: Traditional Roots
Available literary recourses
Mythical Associations
Idea of Nationalism in the Context of Folk art
Idea of Modernism In the context of Folk Art
Relevance of the Art Practice

Week 3: Contextualization and Decontextualization
Concept of Communication for Social Purpose
Aesthetic Perspective
Secularity and Religious Plurality
Ethnographic perspective on the study of Folk Art and Culture

About the Exponents who brought the culture under the limelight

Week 4: Contextualization and Decontextualization
School of Art in Madhubani Painting
Art as a Feminine Preserve vs the Male painters of Madhubani
Yamapata, Pytkar and other art practice of Jharkhand Yamapata by the Jadopatias
Sohari Painters and their Art
Patachitra of Bengal and Odisha

Week 5: Continuum of the Practice: Ancient Centres and Contemporary
Case study 1 Stylistic Variety in Bengal
Case study 2 Stylistic Variety in Odisha
Case study 3 Stylistic Variety in Andhra Pradesh
Exponents and their Contributions
Hypothesis on Possible Stylistic influences

Week 6: Characteristics of Contemporary Collection
Thematic Analysis
Iconic Analysis
Semiotic Analysis
Effect of narratives: Qualitative Evaluation
Individual Expression in Contemporary Art
Week 7: Cultural Condition: Colonial and Post colonial Ideologies
Social Formation during Preindependence
New Aesthetics: early Prints and Battala Prints
Artist Block Makers and Hybrid Aesthetics of Urban Folk Art
Kalighat Painting to Haripura Posters: A synergy
Jamini Roy: Accommodating Vernacular Idiom in Academic Practice

Week 8: Coexistence and Collaborations with Mainstream Art
Strategies for Future and Sustainability: Vision and Revision
Alternative Context: place of folk art in Contemporary Lifestyle
Ancient literary sources and canonization: Scholarly Comments
Need of Paradigm Shift
Conclusion

Sustainable Happiness

Week 1: Unit I-Sustainable Happiness-
A Sustainable sense of Self
a. Sustainable Wellbeing
b. Happiness & Collective Wellbeing
c. Sustainable Happiness Theory (Catherine O'Brien)
d. Happy Classrooms & Green Schools

Week 2: Unit II- Pedagogy of Sustainable Happiness-
a. Education for Sustainable Happiness
b. Learning a Path not a Goal
c. Contemplative learning for Sustainable Transformations
d. Happiness Curriculum: Need for Responsive pedagogy
e. Education for Sustainable Environment/ Ecosystem

Week 3: Unit III- Sustainable Happiness at Work
a. Positive Work culture & HR wellbeing
b. Positive Cognitive & Emotional states & processes in the Workplace
c. Pro-Social behavior & Mental health wellbeing
d. Continuous Professional development
e. Building Resilient Organizations
f. Interplay of Sustainability& Happiness at Work

Week 4: Unit IV- Sustainable Organizations
a. Corporate Social Responsibility & Sustainability
b. Leveraging Workplace Diversity,
c. Work Ethics, Equity & Inclusion Initiatives
d. Sustainability Policies & Practices
e. Sustainable Employee Training , happiness & wellbeing

Week 5: Unit V- Sustainable Leadership
a. Sustainability & Leadership
b. Transforming Self & Others
c. Sustainability Competences
d. Sustainable Lifestyle, Work-life balance &Wellbeing practices
e. Nurturing knowledge &positive attributes for In-house Sustainable Leadership grooming

Week 6: Unit VI- Positive Psychology & Sustainable Happiness
a. Positive character strengths for Sustainable Happiness
b. Positive & Creative organizations
c. Nurturing talent&Career growth
d. Strength-based development in practice (Nudging)
e. Habits of Mind& Life skills for Sustainable Happiness
f. Sustainable Consumption,&Conservation of Resources

Week 7: Unit-VII - Sustainable Wellbeing-
a. Challenges& Opportunities
b. Need for sustainable learning & practices
c. Creativity and Innovation
d. Consumer Wellbeing & Socio-cultural Sustainability
e. Convergence of Triple Bottom-line-Sustainable Ecology, Economy & Just Societies

Week 8: Unit VIII- Sustainable Happiness & UNESCO SDGs

a. Education for Sustainable Development (ESD) for achieving UNESCO Sustainable Development Goals (17 SDGs),
b. ESD for Organizational Sustainability
c. ESD for Social Transformation
d. Value Creation through ESG (Environment-Society-Governance) Services & Strategy
e. Implementing ESD & ESG for Sustainable Collective Happiness/Wellbeing

Soft Skill Development

Week 1: Communication skills 1: The basics
Topics to be covered:
i. Understanding the communicative environment-I
ii. Understanding the communicative environment-II
iii. What to listen for and why
iv. When to speak and how
v. Starting and sustaining a conversation

Week 2: Communication skills 2 : Presentation and interaction
i. What to present and how – I
ii. What to present and how – II
iii. Multimedia presentation: Understanding the basics
iv. Communication styles
v. Speaking in groups

Week 3: Communication skills 3: Visual, nonverbal and aural communication
i. The world of visual culture
ii. Visual perception
ii. The aural: Its relevance and impact
iv. The body and the way it communicates
v. The face, its expressions and what it says

Week 4: Interpersonal communication 1: Individuals, groups and cultures
i. Building Relationships
ii. Understanding Group Dynamics- I
iii. Understanding Group Dynamics- II
iv. Groups, Conflicts and their Resolution
v. Social Network, Media and Extending Our Identities

Week 5: Interpersonal communication 2: Emotional and social skills

Week 6: Developing key traits 1: Creativity, critical thinking and problem solving

Week 7: Developing key traits 2: Motivation, persuasion, negotiation and leadership
i. Motivating oneself
ii.The art of persuasion-I

iii.The art of persuasion-II
iv. From persuasion to negotiation
v. Leadership and motivating others

Week 8: Essential and vocational skills: survival strategies
i. Managing time
ii. Managing stress
iii. Resilience
iv. Work-life balance
v. Applying soft-skills to workplace

Introduction to Market Structures

Week-1: Introduction to Industrial Organization, Consumer behavior and Derivation of Demand curve
Week-2: Production and Cost curves
Week-3: Competitive Market
Week-4: Monopoly
Week-5: Game Theory: Static games of complete information (Nash equilibrium)
Week-6: Dynamic games of complete information (Subgame perfect Nash equilibrium)
Week-7: Cournot Competition
Week-8: Bertrand Competition
Week-9: Stackelberg Games
Week-10: Product Differentiation
Week-11: Entry Deterrence
Week-12: Bundling and Tying

Human Resource Development

Week 1: Introduction to Human Resource Development: Emergent of HRD, Critical HRD roles, challenges for HRD

Week 2: HRD in global perspective, HRD- Performance link, Strategic perspective of HRD

Week 3: HRD Process Model: identification of HRD needs and Design and development of HRD programmes

Week 4: HRD Process Model: Methods of Implantation, Evaluation of HRD programmes

Week 5: Employee coaching and performance management: Coaching to improve poor performance, coachinganalysis, coaching discussion, coaching skills

Week 6: HRD interventions: Mentoring for employee development: Role of mentoring in development,understanding the role and responsibilities of mentor, mentee, implementing the mentoring process,mentoring relationship,

Week 7: Employee counseling for HRD: Overview of counseling programmess, employee assistance programme, stress management, employee wellness and health promotion

Week 8: Competency framework of HRD: why competency mapping? Understanding the competency mapping framework, steps in competency mapping

Week 9: Career Planning, management, and development: Career development stages and activities, role of individual and organization in career planning, Issues in career management

Week 10: Intellectual capital (IC), its measurement and management: Components of IC, measurement models of IC, IC index and challenges for HR

Week 11: HRD, Organizational Learning, and learning organizations

Week 12: The future of HRD and HRD Ethics: Research, practice and education of HRD for innovation and talent development and management, Role of HRD in developing ethical attitude and behavior and development, Ethical problems with HRD roles

Educational Leadership

Week 1: Educational Management & Leadership: Issues & challenges

Week 2: Professional Development & the Reflective Practitioner

Week 3: Professional Ethics & Values in Teaching

Week 4: Key Challenges for Educational Leaders: Grooming Capable & Authentic Educational Leaders

Week 5: Emotional Intelligence & Educational Leadership

Week 6: Leadership for Managing Diversity & Inclusion in Education

Week 7: Educational Leadership in a changing World : 21st Century Challenges

Week 8: Innovative Pedagogy ,Technology & Turnaround Leadership : The Stakeholders' Perspectives

Week 9: New Normal Education, Digital Pedagogy & Online classes, Online Assessment, Evaluation & Feedback Challenges & Opportunities

Week 10: Adult Learning/Andragogy Concept, Process & Outcomes, Critical Self-reflection & Contemplative Learning, National Education Policy2020 , MOOCs Sustainability Competences

Week 11: Transformative Learning: Theory and Practice, Paradigm shift for Indian Education system

Week 12: UNESCO Sustainable Development Goals(SDGs)- (SDG 4 and 4.7), Quality Education, Inclusive Education, Education for Sustainable Development(ESD) Global citizenship, Sustainable Leadership, Relationship building, Multi-stakeholder partnerships,

(1) Sustainable Development Goals **03 Credits**

Category **Faculty of Humanity and Social Science**									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	Sustainable Development Goals	**3**	**-**	**-**	**20**	**20**	**60**	**100**	**03**
NPTEL Link https://onlinecourses.swayam2.ac.in/cec22_hs37/preview									

Course Description:

The course seeks to build an inter-disciplinary perspective on understanding sustainable development concerns and challenges. This course familiarizes students with current debates and perspectives in analyzing constraints and opportunities for sustainable development. It also aims to provide students with a general introduction to the basic core competencies and practical skills required of a "generalist" development practitioner.

Course objectives:

1. The course seeks to build an inter-disciplinary perspective on understanding sustainable development concerns and challenges.
2. To explain the concept of Sustainable Development in detail.
3. To study the Economic, Socio-political and Ecological aspects of Sustainable Development.
4. To understand the concept and importance of natural resources with respect to sustainable development 4. To study various sustainable strategies of firms
5. This course familiarizes students with current debates and perspectives in analyzing constraints and opportunities for sustainable development.

Course Outcome :
After completing the course, the student shall be able to

CO1: Understand the concept of Sustainable Development.
CO2: Acquire knowledge about various Economic, Socio-Political and Ecological aspects of Sustainable Development.
CO3: Acquire knowledge about natural resources and their importance with respect to sustainable development
CO4: Understand the strategies adopted by firms for Sustainable Development.

Detailed syllabus:

Unit I
Changing Perspectives, Definitions & Principles of Sustainable Development, Millennium Development Goals: Status (global and Indian), Inclusive Growth and Poverty Reduction, Impact on approach to development policy and practice in India, future directions

Unit II
Challenges to Sustainable Development, Agriculture, Population & Food Security, Public Health and Nutrition Education, Natural Resources (Forests, Energy, Water), Climate Change.

Unit III
Responses to Sustainable Development Challenges, Public Policy (Community Participation and Participatory Learning), Gender and Human Rights, Technology and Engineering
Economics and Policy Coherence

Unit IV
Need to adopt sustainable strategy, Triple- bottom line Approach – People, Planet & Profit (3 BL Approach) 4.3 Various Strategies for Sustainable Development:-Community Knowledge, Harness Technology, Innovative Practices, Co-Operation and Partnership

Unit V
Green Organizations, Corporate Social Responsibility and Corporate Governance

Required text
1. Raj Kumar Sen Kartik C.Roy, "Sustainable Economic Development & Environment" Atlatic Publishers & Distributors Pvt Ltd
2. Deb Prasanna Choudhary, "Sustainability Management" Zorba Books
3. Dr.Mark Anthony Camilleri," Theory & Practice With Case Studies (CSR, Sustainability , Ethics & Governance" Springer International Publishing
4. Hazell P. and Diao X. (2005) The Role of Agriculture and Small Farms in Economic Development, Washington, D.C.: International Food Policy Research Institute.
5. Sachs J. (2006) The End of Poverty: Economic Possibilities for Our Time, Penguin (Chapters 1-4, 8, 14-18).

Suggested Readings
Cornwall A. and Brock K. (2005) What Do Buzzwords Do for Development Policy? A Critical Look at 'Participation', 'Empowerment' and 'Poverty Reduction', Third World Quarterly 26(7), 1043– 1060.

Human Development Reports
1. IPCC (2007) Summary for Policymakers of the Synthesis Report of the IPCC Fourth Assessment Report.
2. Johnson J.D. and Louka K. (2006) Migration, Aid and Trade: Policy Coherence for Development, OECD Development Centre Policy Brief No 28.
3. Laurence W.F. et al. (2001) The Future of the Brazilian Amazon, Science, Vol. 291 (5503), 438-439.

4. Luboobi L. and Mugisha J.T. (2005) HIV/AIDS Pandemic in Africa: Trends and Challenges, FondazioneEni Enrico Mattei.
5. Sachs D.J. and Wing T.W. (1994) Structural Factors in the Economic Reforms of China, Eastern Europe and the Former Soviet Union, Economic Policy, 9 (18), pp. 101-145.
6. Sachs J. and Malaney P. (2002) The Economic and Social Burden of Malaria, Nature, 415 (7).
7. Sarah D. (2004) Key Policy Coherence Issues in Agriculture and Migration, OECD.
8. UN Millennium Project (2005) Innovation: Applying Knowledge in Development, Science, Technology and Innovation Task Force Report.
9. UN Millennium Project (2005) Investing in Development: A Practical Plan to Achieve the Millennium Development Goals, Overview.
10. World Bank (2006) Enhancing Agricultural Innovation: How to Go beyond the Strengthening of Research Systems, World Bank: Agriculture and Rural Development
11. World Commission on Environment and Development (1987) Our Common Future, Oxford, OUP.

Gender & Violence

WEEK 1	Concept Of Gender: A Social Construct
	Gender: As Performative
	3.1 Gender, Sex and Sexuality
	3.2 Gender, Sex and Gender Identity
	3.3 Sex/gender system
	Masculinity and Femininity
WEEK 2	5.1 Patriarchy
	5.2 Patriarchy and its ideological foundation: Biological Determinism
	Gender Socialisation
	7.1 Agents of Gender Socialization: Family and Peer Group
	7.2 Agents of Gender Socialization: School and Media
	8.1 Gender Stereotypes
	8.2 Gender Stereotypes and Gender Bias
	8.3 Gender Roles and gender attitudes
	8.4 Factors affecting gender identity and gender roles
WEEK 3	9.1 Gender Discrimination
	9.2 Elimination of Gender discrimination
	Gender Inequality
	11.1 Theorising gender based violence
	11.2 Gender-based Violence
	Forms of Gender-based Violence
WEEK 4	13.1 Factors affecting Gender -based Violence
	13.2 Effects of Gender based violence
	Concept of Structural Violence
	Caste Gender And Society
	youth, Gender and Violence
WEEK 5	Domestic and Familial Violence
	Gender and the Conflict Situation

	Violence, Harassment and the Workplace
	Public Space and Violence
WEEK 6	Gender violence and media
	Gender Stereotypes and Media
	Normalisation of Violence
WEEK 7	24.1 Why women's work is not visible
	24.2. Reproductive and care work
	26.1 Changing Roles of Women
	26.2 Women Empowerment
	26.3 Ways to promote women empowerment
	Violence against women in India: A general overview
WEEK 8	Sexual Violence and Harassment
	Sexual Harassment in the Workplace
	Impact of Sexual Violence
WEEK 9	Female Feticide
	Spousal Violence
	Cyber Crime against Women
WEEK 10	33.1 Sex Work: The status and legality of sex work in India
	33.2 The Human Rights and the Dignity of Sex Workers
	Violence during COVID-19 Pandemic
	Shadow Pandemic
WEEK 11	Global Interventions for Curbing Gendered Violence
	Legislative Measures in India for Curbing Gendered Violence
	Role of NGOs in Combating Violence
WEEK 12	Domestic Violence and Domestic Violence Act-2005
	Sexual Violence: Rape and Rape laws in India
	Sexual Harassment of Women at Workplace
WEEK 13	The Protection Of Children From Sexual Offences Act 2012
	The Prohibition of Child Marriage Act, 2006
	National Policy of Empowerment of Women 2001: An Overview
WEEK 14	National Policy of Empowerment of Women-2001
	Legal Resources for Victims of Violence
	Social Activism
WEEK 15	Sexuality Education
	Gender Sensitisation
	Education for Gender Equality

Architectural Approaches to Decarbonization of Buildings

Week 1:
Module 1- Green House Gas Emission
1. Introduction to Green House Gases
2. GHG- Global Scenario and Indian Scenario
3. Strategies to reduce GHG emissions
4. Challenges and future trends in reducing GHGs in building industry

Week 2:
Module 2- India's stand on Decarbonization
5. India's current scenario -Economic & social characteristics on decarbonization
6. India's Environmental & energy strategy towards decarbonization
7. Strategic Low Emissions Development Transitions
8. India's approach to long low carbon development

Week 3:
Module 3- Embodied Energy and Embodied Carbon
9. Adaptation and Resilience to Climate Change
10. What is Embodied Energy and Embodied Carbon
11. Strategies to reduce Embodied Carbon in Built Environment
12. Impact, challenges and future trends in Embodied Carbon

Week 4:
Module 4- Operational Energy and Operational Carbon
13. Introduction to Operational energy and Operational carbon
14. Energy Benchmarking and Standards
15. Impact of Reducing Operational Energy and Carbon
16. Impact, challenges and future trends in operational energy and carbon reduction

Week 5:
Module 5- Architectural and Planning Strategies for Low Energy Consumption – Part 1
17. Passive architecture - Planning strategies
18. Factors Influencing Orientation
19. Passive architecture – Building Form
20. Passive architecture - Planning strategies

Week 6:
Module 6- Architectural and Planning Strategies for Low Energy Consumption – Part 2

21. Passive architecture - Planning strategies
22. Passive architecture with appropriate Planning strategies – Case study
23. Passive architecture with appropriate Planning strategies – Case study
24. Carbon neutrality through Passive Architecture - Openings

Week 7:

Module 7- Landscaping and Carbon Neutrality

25. Carbon neutrality through Passive Architecture - Openings
26. Carbon Neutral architectural design with Vegetation
27. Role of Landscaping in Carbon Neutrality with respect to climate - Part 1
28. Role of Landscaping in Carbon Neutrality with respect to climate- Part 2

Week 8:

Module 8- Renewable and Non-renewable Building Materials

29. Design with Plant Life - Strategies
30. Renewable and Non Renewable Materials – Part 1
31. Renewable and Non Renewable Materials – Part 2
32. Case study examples- Buildings using Renewable and Non Renewable BM

Week 9:

Module 9- Low energy Building Envelope

33. Case study examples- Buildings using Renewable and Non Renewable BM
34. Low Energy Envelope
35. Static vs. Dynamic Building Envelopes
36. Dynamic Low Energy Building Envelope – Case study- Part 1

Week 10:

Module 10- Natural Daylighting as a Strategy – Part 1

37. Dynamic Low Energy Building Envelope – Case study- Part 2
38.Strategies and future of Low Energy envelopes
39. Natural Daylighting in Buildings
40. Systems, technologies, and architecture-Daylight strategies

Week 11:

Module 11- Natural Daylighting as a Strategy – Part 2

41. Strategies for Natural Lighting
42. Efficient Daylighting in Buildings- Case Study- Part 1
43. Efficient Daylighting in Buildings- Case Study- Part 2
44. Embodied Carbon Value for Various Materials (Indian Context)

Week 12:

Module 12- Recap and Concluding lecture

45. Embodied Carbon Value for Various Materials (Indian Context)
46. Impact of Building Materials on Embodied Carbon
47. Material Considerations for Specific Elements
48. Recap and Conclusion

Building Materials and Composites

Week 1: Clay products and alternatives like Fly-ash, CEB, CSEB
Week 2: Stone, stone tiles and stone dust blocksWood and engineered wood
Week 3: Glass and glazing systems, ceramic tiles, vitrified tiles, insulation
Week 4: Fine aggregate, Coarse aggregate, Cement, Concrete
Week 5: Precast items – flooring, roofing, walling system, HBC, AAB
Week 6: Ferrous and non-ferrous metals
Week 7: Bitumen as damp proofing materials, Paints
Week 8: Plastics, Composites, nanotechnology applications

Building Materials as a Cornerstone to Sustainability

Week 1:
Carbon Negative Building Materials – Traditional Building Materials
1. Introduction – Building materials- classification and their significance in Green Buildings. Traditional Building materials and their characteristics (Carbon Negative BM)
2. Carbon Sequestration by Building Materials
3. Traditional Building Materials – Mud
4. Stone, Thatch

Week 2:
5. Bamboo
6. Binders- Lime, Cowdung
7. CLT,
8. Straw bale, Laterite Quarry waste

Week 3:
Alternate Building Materials
9. Introduction - Alternate Building Materials
10. Flyash concrete, Phosphogypsum
11. Furnace Slag
12. Fibre Reinforced Concrete

Week 4:
13. CWD
14. Aerated Concrete
15. Hempcrete, Papercrete
16. Alternate aggregates
17. Milk Paints, Recycled Plastics

Week 5:

Innovative Building Materials

18. Introduction – environmentally friendly, reliable and durable Building Materials
19. Permeable Concrete
20. Nanocellulose composite brick
21. Agro bricks (Date Palm Fibres, Rice Husk, Rice Husk Ash)

Week 6:

22. Agro bricks (Date Palm Fibres, Rice Husk, Rice Husk Ash)
23. Fabrick- cotton and textile ash bricks: Sustainable and Green Advanced Building Materials
24. Introduction -Advanced Building materials
25. Light Transmitting bricks

Week 7:

26. Mycelium composite brick
27. Geopolymer concrete
28. Bioluminous paints
29. Living Bricks for Carbon Sequestration

Week 8:

30. Ecobind tiles
31. Co2 absorbing concrete: Smart Building Materials
32. Introduction- Characteristics of smart materials in comparison to common architectural materials
33. Types of Smart Materials

Week 9:

34. Application of smart materials on building components - Facade systems - smart windows
35. Control of solar radiation transmitting through the building envelope Suspended particle panels - Liquid crystal panels – Photochromics, Electrochromics
36. Control of solar radiation transmitting through the building envelope Suspended particle panels Thermotropic, Thermochromics
37. Control of conductive heat transfer Exterior and exterior radiation (light) sensors Photovoltaics

Week 10:

38. Solid fuel cells
39. Controls / actuators: Shape memory alloys
40. Control of interior heat generation by Heat capacity of interior material Phase-change materials
41. Relative size, location and color of source Light-emitting diodes (LEDs) Lumen/watt energy conversion: Electroluminescents

Week 11:

42. Lighting systems - Optimization of lighting systems
43. Adhesion-changing smart materials - Photo-adhesive smart materials
44. Titanium Di Oxide Products,
45. Thermochromics

Week 12:
46. Magnetorheological and electrorheological
47. Thermotropic, Shape memory
48. Phototropics
49. Mechanochromics, Chemochromics

Modern Indian Architecture

Week 1: Introduction, Pre-Independence, Pre-Independence to Independence- Part 1
Week 2: Pre-Independence to Independence- Part 2, Revivalism, The First Generation 1945 - 1970- Part 1 to 3
Week 3: The First Generation 1945 - 1970- Part 4 to 7, Impact of Western Architects: Le Corbusier- Part 1
Week 4: Impact of Western Architects: Le Corbusier- Part 2 to 4, Impact of Western Architects: Louis I. Kahn- Part 1 to 2
Week 5: Impact of Western Architects: Louis I. Kahn- Part 3 to 4, Impact of Western Architects: Walter Gropius, Introduction to Critical Regionalism, Critical Regionalism: Climate Responsive Perspective- Part 1
Week 6: Critical Regionalism: Climate Responsive Perspective- Part 2 to 4, Critical Regionalism: Other Contexts
Week 7: Structure in Modern Indian Architecture, Points-Blocks and High-Rises, Housing in India- Part 1
Week 8: Housing in India- Part 2, Women in Modern Indian Architecture, Search for a new Architecture

Sustainable Architecture

Week 1: Fundamentals of sustainability, definitions, historical development of the concept of sustainability and sustainable development, Sustainable architecture as a subset of sustainable development.
Week 2: Impacts of built environment on natural environment, Sustainable Development, Agenda 21, UN Goals
Week 3: Characteristics of sustainable architecture, fundamentals of passive designing and climatology, thermal comfort, visual comfort, acoustic comfort

Week 4: Sustainable buildings, parameters of sustainable buildings, Green buildings, indicators of green buildings, Terminologies related to sustainable buildings- carbon footprint, life cycle analysis,

Week 5: Site development- site selection, UHI, Public Transport, vegetation, development footprint, storm water runoff, SRI

Week 6: Water – estimating the use, reductions in consumption, recycling, reuse, landscape requirement, strategies and technology for water conservation

Week 7: IEQ- day lighting, views, CFC free, ventilation, comfort, VOC free

Week 8: Materials and Resources- segregation, recycling, reduction in waste, reuse of materials and building, renewability

Week 9: Energy- energy efficiency, energy conservation, ECBC, renewable energy, M&V

Week 10: Codes and compliances – ECBC, NBC, other rating systems prevalent in india

Week 11: Vernacular architecture and sustainability, culture and sustainability

Week 12: Software use for Energy compliance- Design Builder, Climate Consultant etc

Contemporary Architecture and Design

Week 1: Preamble of Contemporary Architecture Architecture during Post Industrial Revolution Characteristics of Modern Architecture.

Week 2: Phases of Modern Architecture.

Week 3: Phases of Modern Architecture Characteristics of Post-Modern Architecture Phases of Post-Modern Architecture.

Week 4: Phases of Post-Modern Architecture Works of master architects from contemporary era.

Week 5: Phases of Modern Architecture" Brutalism" Phases of Modern Architecture Metabolism Phases of Modern Architecture Late Modern Architecture Modernism in Visual Design Modernism in Industrial Design.

Week 6: Genesis of Post- Modern Design Language Characteristics of Post-Modern Architecture and Design Phases of Post- Modern Architecture Historicism Phases of Post- Modern Architecture High-tech Architecture Phases of Post- Modern Architecture Neo-modern.

Week 7: Phases of Post- Modern Architecture Critical regionalism Phases of Post- Modern Architecture Critical regionalism Phases of Post- Modern Architecture Deconstructivism Phases of Post- Modern Architecture Deconstructivism Postmodernism in Visual Design.

Week 8: Post-modernism in Industrial Design Works of master architects Modern era Works of master architects Modern era Works of master architects Post- Modern era Works of master architects Post- Modern era.

Detailed syllabus for Open Elective Courses in

Basics of Health Promotion and Education Intervention

Week 1: Concepts of health promotion including history
Week 2: Health behavior, health communication and Health Literacy
Week 3: Information Education Communication (IEC), Behavior Change Communication (BCC), and Social and Behavior Change Communication (SBCC), and their applications in different settings (including role of social determinants of health)
Week 4: Need assessment for health promotion (including health behavior models)
Week 5: Planning and implementing a HPE intervention
Week 6: Designing of messages and pretesting
Week 7: Materials and methods
Week 8: Evaluation of HPE intervention

Research Methods in Health Promotion

Week 1: Introduction to Research Methods in Health promotion
Week 2: Theories and Models in Health Promotion and Health Behavior - part I
Week 3: Theories and Models in Health Promotion and Health Behavior - part II
Week 4: Quantitative Techniques in Health Promotion: Research designs
Week 5: Qualitative methods in Health Promotion
Week 6: Mixed methods techniques in Health Promotion
Week 7: Study Tool development in Health Promotion
Week 8: Designing interventions in Health Promotion
Week 9: BCC and SBCC
Week 10: Community-Based Participatory Research in context to Health Promotion
Week 11: Data analysis in Health Promotion
Week 12: Research Proposal Writing and Reporting the Research Findings

(1) Introduction to Psychology **03 Credits**

Category Faculty of Health Science									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	Introduction to Psychology	**3**	**-**	**-**	**20**	**20**	**60**	**100**	**03**
NPTEL Link https://onlinecourses.nptel.ac.in/noc21_hs49									

Detailed Syllabus
Unit I
Major milestones in psychology; Major areas of psychology; Major methods used in psychology; Redefining boundaries of the discipline

Unit II
Perception and Learning

Unit III
Memory and Emotion

Unit IV
Genetic and Environmental bases of behavior, Personality

Unit V
Lab session: Perception

Books and references
1. Feldman, R.S. (2004). Understanding Psychology. Tata McGraw-Hill, New Delhi

Quantum Computing

Course Plan:

•Quantum Measurements Density Matrices

•Positive-Operator Valued Measure

•Fragility of quantum information: Decoherence

•Quantum Superposition and Entanglement

•Quantum Gates and Circuits

•No cloning theorem & Quantum Teleportation

•Bell's inequality and its implications

•Quantum Algorithms & Circuits

•Deutsch and Deutsch–Jozsa algorithms

•Grover's Search Algorithm

•Quantum Fourier Transform

•Shore's Factorization Algorithm

•Quantum Error Correction: Fault tolerance

•Quantum Cryptography

•Implementing Quantum Computing: issues of fidelity

•Scalability in quantum computing

•NMR Quantum Computing

•Spintronics and QED approaches

•Linear Optical Approaches

•Nonlinear Optical Approaches

•Limits of all the discussed approaches

•How promising is the future?

Books and references

1. Michael A. Nielsen and Issac L. Chuang, "Quantum Computation and Information", Cambridge (2002).

2. Riley Tipton Perry, "Quantum Computing from the Ground Up", World Scientific Publishing Ltd (2012).

3. Scott Aaronson, “Quantum Computing since Democritus”, Cambridge (2013).

4. P. Kok, B. Lovett, “Introduction to Optical Quantum Information Processing”, Cambridge (2010).

Introduction to Quantum Computing: Quantum Algorithms and Qiskit

Course Plan:

Week 1: Introduction and IBM Quantum Perspective, Q Mission in India – Invited talk, Quantum Computing Applications, Quantum Computing Basics

Week 2: IBM Quantum Composer and Quantum Lab using Qiskit

Week 3: Quantum Algorithms-I (Oracles, Deustch Jozsa), Quantum Algorithms-II (Grover's Algorithm with Hands-on)

Week 4:Quantum Error Correction, NISQ era Quantum Algorithms (VQE/QAOA and industrial applications)

Books and references

1. Qiskit Textbook: https://qiskit.org/textbook/preface.html
2. YouTube Quantum learning series: https://www.youtube.com/playlist?list=PLOFEBzvs-Vvp2xg9-POLJhQwtVktlYGbY
3. Quantum Computation and Quantum Information, Textbook by M. A. Nielsen and I. Chuang, Cambridge University Press (2010).

Quantum Information and Computing

Course Plan:

Week 1: Why Quantum Computing?, Postulates of Quantum Mechanics – I, Postulates of Quantum Mechanics – II, Qubits and Bloch Sphere
Week 2: Basic Quantum Gates, Quantum Circuits , No Cloning Theorem and Teleportation , Dense coding

Week 3: Density Matrix-I, Density Matrix – II, Projective measurement, POVM, EPR and Bell's Inequalities-I, Bell's Inequalities – II

Week 4: Deutsch Algorithm , Deutsch-Jozsa Algorithm , Simon Problem , Grover's Search Algorithm – I , Grover's Search Algorithm –II , Grover's Search Algorithm –III , Grover's Search Algorithm –IV

Week 5: Quantum Fourier Transform –I , Quantum Fourier Transform –II , Period Finding, Method of Continued Fraction , Shor's Factorization Algorithm ,

Week 6: Quantum Error Correction Codes , Quantum error Correction Codes

Week 7: Classical Information Theory , Shannon Entropy -I , Shannon entropy-II , Von Neumann Entropy-I , Von Neumann Entropy –II

Week 8: Classical Cryptography , RSA Algorithm , Quantum Cryptography – BB 84 protocol , B-92 and Eckart protocol , Practical realization of a quantum computer-I , Practical Realization of Quantum Computer -II

Dynamics of Classical and Quantum Fields

Course Plan

Week 1: Review of Lagrangian mechanics and the Hamiltonian formulation.

Week 2: Symmetries and Noether's theorem.

Week 3: The Electromagnetic Field and Stress Energy Tensor.

Week 4: Elasticity Theory and Fluid Mechanics.

Week 5: Toward Quantum Fields: Scalar and Spinor Fields.

Week 6: Concept of Functional Integration.

Week 7: Quantum Mechanics Using Lagrangians: Path Integrals.

Week 8: Creation and Annihilation Operators in Fock Space.

Week 9: Quantum Fields on a Lattice.

Week 10: Green Functions: Matsubara and Nonequilibrium.

Week 11: Coherent State Path Integrals.

Week 12: Non-local operators in Quantum Many Body Physics.

Books and references

1. Girish S. Setlur, Dynamics of Classical and Quantum fields: An Introduction. CRC Press (2013)
2. Itzykson C., Zuber J.B., Quantum Field Theory, Dover Publications (2012)
3. Peskin and Schroeder, Introduction to quantum field theory, Addison-Wesley (1995)
4. L. D. Landau and E. M. Lifshitz, Classical Theory of Fields: Course of Theoretical Physics, vol.2 (4th edn.), Butterworth Heinemann (1975)
5. E. N. Economou, Green's functions in Quantum Physics, Springer Series in Solid State Sciences – vol 7 (2006)

(1) Introduction to MATLAB 03 Credits

Category Faculty of Science									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	Introduction to MATLAB	**3**	**-**	**-**	**20**	**20**	**60**	**100**	**03**
NPTEL Link https://onlinecourses.nptel.ac.in/noc19_ee45/									

Detailed syllabus:

Unit I

Introduction MATLAB: Introduction MATLAB, MATLAB window, Command window , workshop window, workspace, basic command assigning variables, operations with variables, data files and data types, characters and string.

Unit II

Control Loops: Control statement programming, conditional statement programming, loop and conditional statements, if, else, switch, for, while, continue, break, programming with control statements

Unit III

Functions: Function definition, User defined function, Built in function, Function calling, Return value, Type of functions, Global Variable.

Array and Linear Equations: Array definition, Types of Array, Matrix Arithmetic operations, Array Arithmetic operations, operators and special characters, Relational , mathematical and logical operators, matrix operations, transpose Determinant and inverse and matrix function.

Unit IV

MATLAB Operations and Plot: Arithmetic operations, operators and special characters, solving arithmetic equations, matrix operations. Trigonometric functions, complex numbers, fractions real numbers, M file, plots 2D, 3D, GUI design

Debugging M Files: Debugging process, preparation for debugging, setting break points, running with break points, correcting and ending debugging, correcting Mfile.

Unit V

Application of MATLAB: Numerical solution of nonlinear equations, numerical solution of simultaneous linear algebraic equations, numerical differentiation and integration, linear and nonlinear regressions , numerical solution of ordinary differential equations, numerical solution of partial differential equations.

(2) CO_2 Capture, Sequestration and Utilization 02 Credits

Category Faculty of Science									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	CO_2 Capture, Sequestration and Utilization	**2**	**-**	**-**	**20**	**20**	**60**	**100**	**02**
NPTEL Link https://onlinecourses.nptel.ac.in/noc24_ge49/									

Detailed Syllabus

Unit I

CO_2 capture technologies from power plants: Post-combustion capture, Pre-combustion capture, Oxy-fuel combustion, chemical looping combustion, calcium looping combustion.

Unit II

CO_2 capture agents and processes: Capture processes, **CO_2** capture agents, adsorption, ionic liquids, metal organic frameworks.

Unit III

CO_2 storage and sequestration: Geological sequestration methods, Biomimetic carbon sequestration.

Unit IV

CO_2 Utilization: CO_2 derived fuels for energy storage, polymers from **CO_2**, **CO_2** based solvents, CO2 to oxygenated organics, Conversion into higher carbon fuels, High temperature catalysis

Unit V

Environmental assessment of CO_2 capture and utilization: Need for assessment, Green chemistry and environmental assessment tools, Life cycle assessment (LCA), ISO standardization of LCA, Method of conducting an LCA for **CO_2** capture and Utilization.

Text Books:

1. Carbon dioxide utilization: Closing the Carbon Cycle, Peter Styring, Elsje Alessandra Quadrelli, Katy Armstrong, Elsevier, 2015, 1st Edition.
2. Carbon Capture, Storage and, Utilization: A Possible Climate Change Solution for Energy Industry ,Goel M, Sudhakar M, Shahi RV, TERI, Energy and Resources Institute, 2015, 1st

Edition.
3. Carbon Capture and Storage, CO2 Management Technologies, AmitavaBandyopadhyay, CRC Press, 2014, 1st Edition.

Reference Books:
1. Calcium and Chemical Looping Technology for Power Generation and Carbon Dioxide (CO2) Capture, Fennell P, Anthony B, Woodhead Publishing Series in Energy: No. 82, 2015, 1st Edition.
2. Developments in Innovation in Carbon Dioxide Capture and Storage Technology: Carbon Dioxide Storage and Utilization, Mercedes Maroto-Valer M, Vol 2, Woodhead Publishing Series in Energy, 2014, 1st Edition.
3. Fundamentals of Enhanced Oil and Gas Recovery from Conventional and Unconventional Reservoirs, AlirezaBahadori, Elsevier Inc., 2018, 1st Edition.

Online Resources:
1. https://nptel.ac.in/courses/103/107/103107157/
2. https://sequestration.mit.edu/
3. http://www.coal.nic.in/
4. http://moef.gov.in/en/
5. https://mnre.gov.in/
6. https://climate.mit.edu/explainers/carbon-capture
7. https://www.sciencedirect.com/book/9780128130278/fundamentals-of-enhanced-oil-and-gas-recovery-from-conventional-and-unconventional-reservoirs#book-info

(3) Waste to Energy 02 Credits

Category Faculty of Science									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	Waste to Energy	**2**	**-**	**-**	**20**	**20**	**60**	**100**	**02**
NPTEL Link https://onlinecourses.nptel.ac.in/noc20_ch16									

Detailed Syllabus

Unit I
Introduction, characterization of wastes, Energy production form wastes through incineration, energy production through gasification of wastes.

Unit II
Energy production through pyrolysis and gasification of wastes, syngas utilization. Densification of solids, efficiency improvement of power plant.

Unit III
Energy production from waste plastics, gas clean up, Energy production from organic wastes through anaerobic digestion and fermentation,

Unit IV
Introduction to microbial fuel cells, Energy production from wastes through fermentation and transesterification.

Unit V

Cultivation of algal biomass from wastewater and energy production from algae.

Books and References:

1. Rogoff, M.J. and Screve, F., "Waste-to-Energy: Technologies and Project Implementation", Elsevier Store.
2. Young G.C., "Municipal Solid Waste to Energy Conversion processes", John Wiley and Sons.
3. Harker, J.H. and Backhusrt, J.R., "Fuel and Energy", Academic Press Inc.
4. EL-Halwagi, M.M., "Biogas Technology- Transfer and Diffusion", Elsevier Applied Science.
5. Hall, D.O. and Overeed, R.P.," Biomass - Renewable Energy", John Willy and Sons.
6. Mondal, P. and Dalai, A.K. eds., 2017. Sustainable Utilization of Natural Resources. CRC Press.

(4) History of Science Technology 03 Credits

Category Faculty of Science									
Code	**Subject Name**	**L**	**T**	**P**	**CA**	**MSE**	**ESE**	**Total**	**Credits**
	History of Science Technology	**3**	**-**	**-**	**20**	**20**	**60**	**100**	**03**
NPTEL Link https://onlinecourses.nptel.ac.in/noc24_ge49/									

Unit I

Historical Perspective : The Nature of Science and Technology , Roots of Science and Technology in India , Science and Society , Scientists and Society , Science and Faith and The Rise of Applied Sciences.

Unit II

Polices and Plans after Independence: Nehru's vision of Science for Independent India, Science and Technology Developments in the New Era Science and Technology Developments during the Five Year Plan Periods and Science and Technology Policy Resolutions.

Unit III

Research and Development (R&D) in India: Expenditure in R&D, Science and Technology Education, Research Activities and Promotion of Technology Development, Technology Mission, Programms Aimed at Technological self Reliance, Activities of Council of Scientific and Industrial Research (CSIR).

Unit IV

Science and Technological Developments in Major Areas : Space – Objectives of Space Programms, Geostationary Satellite Services – INSAT System and INSAT Services Remote Sensing Applications, Launch Vehicle Technology Ocean Development – Objectives of Ocean Development, Biological and Mineral Resources, Marine Research and Capacity Building;

Unit V

Defense Research: Spin–off Technologies for Civilian Use

Biotechnology: Applications of Biotechnology in – Medicine, Biocatalysts, Agriculture, Food,
Fuel and Fodder, Development of Biosensors and Animal Husbandry;

Energy: Research and Development in Conservation of Energy , India's Nuclear Energy Programme –Technology Spin –offs.
Technological Innovations and Barriers of Technological Change.

Test Books :

1. Kalpana Rajaram , Science and Technology in India, Published and Distributed by Spectrum Books (P) Ltd., New Delhi-58.
2. Srinivasan, M., Management of Science and Technology (Problems & Prospects), East
–West Press (P) Ltd., New Delhi.

Reference Books :

1. Ramasamy , K. A. and Seshagiri Rao, K.,(Eds.) Science, Technology and Education for Development, K., Nayudamma Memorial Science Foundation, Channai-8.
2. Kohili, G. R., The Role and impact of Science and Technology in The development of India, Surjeet Publications.
3. Government of India, Five Year Plans, Planning Commission, New Delhi. Sharma, K. D.and
Quresh M. A., Science, Technology and Development, Sterling Publications (p) Ltd. New Delhi.

Algebra

Week – 1

1. Polar Representation of Complex Numbers
2. nth Root of Unity
3. De Moivre's Theorem for Rational Indices
4. Equivalence Relation

Week – 2

5. Composition of Functions and Invertible Functions
6. One-to-one Correspondence and Cardinality of a set
7. Division Algorithm
8. Divisors and Euclidean Algorithm

Week – 3

9. Congruence Relation Between Integers
10. Statement of Fundamental Theorem of Arithmetic and Principle of Mathematical Induction
11. Systems of Linear Equations, Row Reduction and Echelon Forms
12. The Matrix Equation Ax=b and the Solution Set of Linear System

Week – 4

13. Application Of Linear System and Linear Independence
14. Introduction to linear transformation and matrix of a linear transformation
15. The Inverse of a Matrix
16. Subspace of ln and Rank of a matrix

Week – 5

17. Eigen value and Eigen vector - I
18. Eigen value and Eigen vector - II

19. Diagonalization of Matrix
20. Problems

Week – 6

21. Groups Introduction - I
22. Groups Introduction - II
23. Subgroups

Week – 7

24. Elementary Properties of Abelian Groups
25. Elementary Properties of Non-Abelian Groups
26. The Group of Integer Modulo n

Week – 8

27. Complex Roots of Unity
28. Cyclic Group
29. General Linear Group

Week – 9

30. The Group of Symmetries
31. Subgroup Generated by a Subset
32. Cosets and Index of Subgroups

Week – 10

33. Properties of Group Homomorphisms
34. Normal Subgroups
35. Quotient Groups

Week – 11

36. Class Equation
37. Direct Product of a Finite Number of Groups
38. Fundamental Theorem of Finite Abelian Groups
39. Cayley Theorem and Problems in Group Theory

Week – 12

40. Ring-Introduction
41. Class of Ring
42. Rings from Number Systems

Week – 13

43. Ring of Real Quaternions and Rings of Continuous Functions
44. Rings of Matrices
45. Polynomial Rings
46. Subrings and Ideals

Week – 14

47. Set of Zero Divisors and Group of Units
48. Properties of Ring Homomorphisms
49. Operations on Ideals

Week – 15

50. Integral Domains and Fields
51. Maximal Ideals and Prime Ideals
52. Euclidian Domains and Principal Ideal Domains
53. Unique Factorization Domains