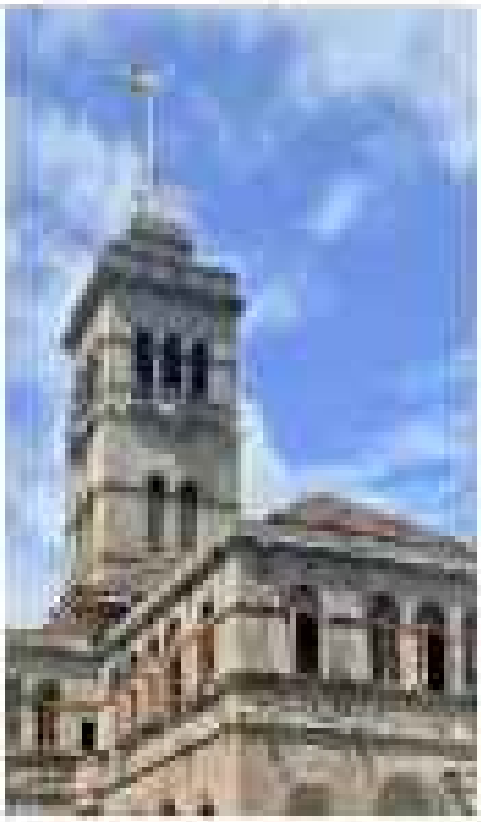
Savitribai Phule Pune University, Pune

Maharashtra, India



National Education Policy (NEP)-2020 Compliant Curriculum

Second Year Engineering

Open Electives for Semester III and Semester IV

(With effect from Academic Year 2021-22)

Contents

Preface by Dean (Science and Technology)

Dear Students and Teachers,

Open elective courses, as per the National Education Policy (NEP), are courses chosen by students from disciplines outside their core program, promoting interdisciplinary learning and broadening their knowledge base. These electives allow students to explore diverse subjects and gain a more holistic education. The National Education Policy (NEP) 2020 in India places a strong emphasis on multidisciplinary education, and Open Electives (OEs) are a key component in achieving this goal.

NEP 2020 empowers students with greater flexibility to choose their learning trajectories. OEs allow students to select courses based on their interests, talents, and career goals, even if they are from a different faculty or department. A science student might take an OE in humanities or commerce, a commerce student in science or arts, and so on. This exposure broadens their perspective and understanding.

This document lists the Open Electives offered to various programmes under the science and technology faculty, by other faculty including Science, Commerce, Management, Humanities or Inter Disciplinary studies. Students can select any course from the basket of the electives provided in the document. The overall NEP 2020 curriculum framework aims for a holistic education, integrating arts, crafts, humanities, games, sports, fitness, languages, literature, culture, and values alongside science and mathematics. OEs contribute significantly to this integrated approach.

We hope that this curriculum will inspire students to become competent professionals, responsible citizens, and contributors to the technological advancements of society.

Dr. Pramod Patil
Dean
Science and Technology
Savitribai Phule Pune University

Savitribai Phule Pune University, Pune

Maharashtra, India

Semester - III

Open Elective - I		
Course Code	Offering Faculty	Course Name
[illegible]	Commerce	Financial Accounting
[illegible]	Pension	Digital Finance
[illegible]	Management	Digital Marketing
[illegible]	Management	Digital Business
[illegible]	Management	Digital Human Resource
[illegible]	Management	Personal Finance & Management
[illegible]	Science	Web Technology
[illegible]	Science	Data Mechanics
[illegible]	Management	Supply Chain Management
[illegible]	Commerce	Digital Manufacturing

With effect from Academic Year 2025-26

Savitribai Phule Pune University		
[illegible] : Financial Accounting		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : 15 Marks End Semester: 35 Marks

Course Objectives: The course aims to:

1. To build upon the foundational knowledge of financial accounting acquired in the first year.
2. To develop a deeper understanding of the theoretical underpinnings of financial reporting.
3. To equip students with the ability to apply accounting standards to complex business transactions.
4. To enable students to analyze and interpret financial statements for decision-making purposes.
5. To introduce students to specialized accounting topics relevant to various industries.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Apply accounting Principles and Standards to Account for Assets management.
- CO2: Analyze and apply accounting Principles and standards to Liabilities, and Equity.
- CO3: Prepare and Analyze Financial Statements for Various Business Entities, including Specialized Transactions.
- CO4: Evaluate the Impact of Different Accounting Methods on Financial Statements & Business Performance for Informed Decision Making.

Course Contents
Unit I - Accounting for Assets (07 Hours)

Property, Plant, and Equipment (PP&E): Acquisition, cost determination, and capitalization. Depreciation methods (straight-line, reducing balance, units of production), Impairment of assets (concepts and accounting treatment), Accounting for disposals and exchanges. Relevant Accounting Standards (AS 10, Ind AS 16).

Inventory: Inventory costing methods (FIFO, LIFO, weighted average), Lower of cost or net realizable value (LCNRV), Inventory systems (periodic and perpetual), Relevant Accounting Standards (AS 2, Ind AS 2).

Intangible Assets: Recognition, measurement, and amortization of intangible assets (patents, trademarks, goodwill, etc.), Impairment of intangible assets, Accounting for research and development costs (AS 26, Ind AS 38, etc.).

Unit II - Accounting for Liabilities and Equity (07 Hours)

Liabilities: Accounting for current liabilities (accounts payable, short-term debt), Accounting for long-term liabilities (bonds payable, loans), Concepts of provisions, contingent liabilities, and contingent assets (e.g., AS 29, Ind AS 37).

Equity: Share capital: Types of shares, issue, forfeiture, and reissue of shares, Accounting for share issue, buyback, and bonus shares; Dividends: Types, declaration, and payment.

Unit III - Corporate Accounting - (08 Hours)

Accounting for share capital and debentures, Preparation of company final accounts Introduction to cash flow statements (basic concepts and preparation as per AS 3 or IAS 7), Understanding and accounting for share buyback, Accounting for bonus shares and rights issue, Introduction to interim and final dividends.

Branch Accounting: Accounting for dependent branches, Accounting for independent branches and reconciliation.

Lease Accounting: Types of leases (operating and finance leases), Accounting treatment for operating and finance leases.

Unit IV Special Accounting Topics - (08 Hours)

Objectives of financial statement analysis, Tools and techniques of financial statement analysis: Horizontal analysis (trend analysis), Vertical analysis (common size statements).

Ratio analysis: Liquidity, solvency, profitability and efficiency ratios. Interpretation of financial statements.

Limitations of financial statement analysis: Historical cost concept, Use of estimates, Impact of different accounting policies, Limited information about non-financial factors, Potential for manipulation.

Learning Resources

Text Books:

1. S.N. Maheshwari and S.K. Maheshwari, "Advanced Accountancy" 11th Edition, S. Chand and Company.
2. R.L. Gupta and M. Radhaswamy, "Corporate Accounting", 13th Edition, S. Chand and Company

Reference Books:

1. Subramanyam and Wild, "Financial Statement Analysis Handbook", Johnstone publication.
2. Benjamin Graham and Charles McCalock, "Interpretation of Financial Statements", Harper Business.
3. Relevant Accounting Standards issued by ICAI/ IASB.

MOOC / NPTEL/YouTube Links:

1. Institute of Chartered Accountants of India (ICAI): https://www.icai.org/
2. International Accounting Standards Board (IASB): https://www.ifrs.org/
3. Securities and Exchange Board of India (SEBI): https://www.sebi.gov.in/
4. Financial Accounting Standards Board (FASB): https://www.fasb.org/
5. Accounting Tools: https://www.accountingtools.com/

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Teaching Scheme	Credits	Examination Scheme
Theory : 03 Hours/Week	03	CCE : 25 Marks End Semester: 75 Marks

Prerequisite Courses, if any :

1. Basic Finance and Economics
2. Cyber security & Digital Payments

Course Objectives: The course aims to:

1. The evolution of digital finance and the influence of big data on financial systems.
2. Digital payment ecosystems and ongoing transformations in digital banking.
3. Core concepts of blockchain, cryptocurrencies, and decentralized finance.
4. Applications of AI, machine learning, and analytics in financial services.
5. Cybersecurity measures, financial risk factors, and regulatory developments in digital finance.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1 : Explain the basics of digital finance, big data, and regulatory frameworks
- CO2 : Analyze digital payments, FinTech trends, and new banking models.
- CO3 : Illustrate blockchain, cryptocurrencies, and DeFi systems.
- CO4 : Illustrate the role of AI/ML for financial analytics.
- CO5 : Apply cybersecurity and compliance strategies for digital finance.

Course Contents
Unit I : Digital Finance Fundamentals & Big Data (07 Hours)

Evolution & Fundamentals of Digital Finance : Evolution of digital finance and the shift from traditional to digital systems. Introduction to FinTech and technological transformations in financial services. Overview of regulatory frameworks and compliance in the digital era.

The Role of Big Data in Finance : Role of big data in shaping financial decision-making and risk management. Leveraging data science for personalization and modern financial services.

Case Study: ABC Bank's Digital Transformation

Unit II : Digital Payment Systems & Digital Banking Transformation (07 Hours)

Digital Payment Ecosystems : Historical evolution and digitization of payment systems (ECS, RTGS, NEFT, IMPS, UPI), mobile wallets, contactless payments). Facilitators of a well-functioning payments system and the role of banks.

FinTech Innovations & Disruption : FinTech startups, challenger banks, and peer-to-peer lending models, FinTech applications across banking, WAPCs, insurance, lending, audit, and compliance. Regulatory guidelines (e.g., RBI guidelines) and risks associated with new payment models. The Future of Digital Banking : How traditional banks are adapting and the rise of neo-banks. Digital banking trends and evolving customer expectations.

Case Study : Unified Payments Interface (UPI) in India.

Unit III : Blockchain, Cryptocurrencies & Decentralized Finance (08 Hours)

Blockchain Technology: Fundamentals of blockchain and underlying cryptographic techniques. Smart contracts and decentralized finance (DeFi) applications. **Cryptocurrencies & Digital Assets:** Overview and evolution of cryptocurrencies (Bitcoin, Ethereum, etc.), Central Bank Digital Currencies (CBDCs) and other emerging digital assets. **Advanced Applications & Case Studies:** Impact of blockchain on payments, lending, and financial settlements; Real-world case studies and disruptive potential in global finance.

Case study: The Sand Dollar (Bahamas' CBDC)

Unit IV : Artificial Intelligence, Machine Learning & Financial Analytics (08 Hours)

AI & Machine Learning in Finance: Predictive analytics in stock markets, trading, and algorithmic/high-frequency trading. Credit risk analysis and automated decision-making using AI.

Data Analytics & Financial Applications: Data sourcing, cleaning, processing, and visualization for financial data. Sentiment analysis and AI-driven portfolio management.

Practical Projects & Case Studies: Hands-on projects: building stock price prediction models, fraud detection systems, and credit score prediction models. Real-world applications in digital banking and wealth management.

Case study : Thread programming Using Pthreads, POSIX

Learning Resources

Text Books:

1. C. Skinner, Digital Finance: Big Data, Startups, and the Future of Financial Services, 1st ed. Hoboken, NJ, USA: Wiley, 2018.

2. J. H. M. T. Jeffy, Introduction to FinTech, 1st ed. Noida, India: Pearson Publications, 2018

3. D. Tapscott and A. Tapscott, The Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World, 1st ed. New York, NY, USA: Penguin Random House, 2016.

4. M. López de Prado, Machine Learning for Asset Managers, 1st ed. Cambridge, UK: Cambridge University Press, 2020.

5. "FinTech: The Impact and Role of Financial Technology" by Parag K. Patel, Wiley publications, 1st edition

Reference Books:

1. B. Ulrich, Future Money: Fintech, AI and Web3. London, UK: Kogan Page, 2023

2. Y. Hilpisch, Artificial Intelligence in Finance: A Python-Based Guide, 1st ed. Sebastopol, CA, USA: O'Reilly Media, 2020.

3. M. López de Prado, Advances in Financial Machine Learning, 1st ed. Hoboken, NJ, USA: Wiley, 2018.

4. S. Chishti and J. Barberis, The FINTECH Book: The Financial Technology Handbook for Investors, Entrepreneurs, and Visionaries, 1st ed. Hoboken, NJ, USA: Wiley, 2016.

5. D. Drescher, Blockchain Basics: A Non-Technical Introduction in 25 Steps, 1st ed. Berkeley, CA, USA: Apress, 2017.

6. B. Hiers, Digital Finance: Security Tokens and Unlocking the Real Potential of Blockchain, 1st ed. Hoboken, NJ, USA: Wiley, 2020.

E-Books

1. [illegible], Digital Finance: Big Data, Start-ups, and the Future of Financial Services, 1st ed. London, U.K.: Routledge, 2019. Link: https://download.e-bookshelf.de/download/[illegible].pdf
2. [illegible] and [illegible], Big Data and Artificial Intelligence in Digital Finance, 1st ed. Cham, Switzerland: Springer, 2022 Link: https://library.oapen.org/bitstream/[illegible].pdf
3. [illegible], An Introduction to Digital Financial Services, 1st ed., 2018. Link: https://www.[illegible]

MOOC / NPTEL / YouTube Links

1. https://www.my-mooc.com/en/mooc/introduction-to-fintech/
2. https://mooc.[illegible]project.eu/courses/blockchain-use-cases-in-digital-finance/
3. https://www.coursera.org/specializations/digital-transformation-financial-services

[illegible] World Peace University		
[illegible] : Digital Marketing		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : 15 Marks End Semester: 35 Marks

Companion Course : Information and Cyber Security Laboratory

Course Objectives: The course aims to:

1. To understand the basic Concepts of Digital marketing and the road map for successful Digital marketing strategies.
2. To know the importance of Social Media Platforms importance in Digital Marketing
3. To understand the technological importance of Search Engine Optimization (SEO)

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1 : Understand the basic Concepts of Digital marketing
- CO2: Apply digital marketing tools for suitable applications
- CO3: Examine the various social media and design Advertising campaigns
- CO4: Learn search engine optimization (SEO) techniques and apply it for suitable application to increase page views.
- CO5 : Analyze social media advertising platforms

Course Contents

Unit I : Introduction to Digital Marketing (07 Hours)

Fundamentals of Digital marketing & its Significance, Traditional marketing Vs Digital Marketing, Evolution of Digital Marketing, Digital Marketing Landscape, Key Drivers, The Digital users in India, Digital marketing Strategy- Consumer Decision journey Digital advertising Market in India, Skills in Digital Marketing, Digital marketing Plan.

Unit II : Digital Marketing Terminology (07 Hours)

Terminology used in Digital Marketing, PPC and online marketing through social media, Social Media Marketing, Google web master and analytics overview, Email Marketing, Mobile Marketing
Display advertising, Buying Models, different type of ad tools, Display advertising terminology, types of display ads, Different ad formats

Unit III : Social Media Marketing (08 Hours)

Fundamentals of Social Media Marketing& its significance, Necessity of Social media Marketing
Facebook Marketing: Facebook for Business, Facebook Insights, Different types of Ad formats, setting up Facebook Advertising Account, Facebook audience & types, Designing Facebook Advertising campaigns, Facebook Avatar, Apps, Live, Hashtags

Unit IV : Search Engine Optimization (SEO) (08 Hours)

Introduction to SEO, How Search engine works, SEO Phases, History Of SEO, How SEO Works, Googlebot (Google Crawler), Types of SEO technique, Keyword Planner tools
Social media Reach, Video Creation & Submission, Maintenance - SEO tactics, Google search Engine

Learning Resources:

Text Books:

1. S. Ahuja, Digital Marketing, Oxford University Press

2. D. Ryan, C. Jones, "Understanding Digital Marketing Strategies for Engaging the Digital Generation", Kogan Page Publications, (2nd Edition)

3. Chhavi Kumar, Vikram Kumar, "Digital Marketing", Himalaya Publishing House, (2nd Edition)

Reference Books:

1. D. Ammerman, A. Jones, "Quick win Digital Marketing", Paperback edition, Oak Tree Press

2. Seema Gupta, "Digital Marketing", Mc Graw Hill (2nd Edition)

Savitribai Phule Pune University		
OEL- 2200 : Digital Business		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : 15 Marks End Semester: 35 Marks

Course Objectives: The course aims to:

1. To analyze digital technologies' impact on business models.
2. To evaluate emerging platforms like AI and blockchain, create innovative digital solutions.
3. To apply data analytics for strategic decisions, and assess ethical and sustainability challenges in digital business.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1 - Understand the digital economy's societal impact.
- CO2 - Apply digital strategies practically.
- CO3 - Use analytics tools for digital business.
- CO4 - Develop critical thinking to solve digital business challenges, and address ethical, legal, and sustainability issues responsibly, ensuring readiness for diverse roles in the digital business landscape.

Course Contents

Unit I - Foundations of Digital Business (07 Hours)

Overview of the Digital Economy and Society, Digital Transformation and its Impact, The Digital Ecosystem - Strategies and Characteristics, Online and Virtual Communities, Defining Digital Business: Scope and Evolution, Emerging Platforms - AI-Driven Marketplaces, Blockchain-Based Systems, Metaverse Commerce, E-Business Models - B2B, B2C, C2C, D2C, Hybrid Models, Integration of Physical and Digital Marketspaces, Web 3.0 and Decentralized Platforms. Drivers - Scalability, Data Analytics, Automation, AI, Benefits - Global Reach, Personalization, Efficiency, Limitations - Cybersecurity Risks, Digital Divide, Impact on Businesses, Consumers, Government, Society.

Case Study :

1. Amazon's Digital Ecosystem: How Amazon integrates AI-driven recommendations, cloud computing (AWS), and marketplace strategies to dominate e-commerce.
2. Nike's Digital Transformation: Leveraging data analytics and direct-to-consumer (D2C) models to enhance customer engagement via the Nike+ app.

Unit II - Mobile, Social, and IoT-Driven Commerce (07 Hours)

Mobile Commerce - Evolution, Applications, 5G Impact, Mobile Marketing - Location-Based Advertising, In-App Purchases, Mobile Wallets. Social Commerce - Social Media Marketplaces, Influencer Economy, Live-Streaming Commerce, Social Business Networks - Enterprise Collaboration Tools, Social Media Analytics. Benefits - Customer Engagement, Brand Loyalty, Limitations - Privacy Concerns, Platform Dependency. Internet of Things (IoT) - Retail, Supply Chain, Smart Cities, Healthcare, IoT Applications - Connected Devices, Predictive Maintenance, Edge Computing, Wearables.

Case Study :

1. Starbucks Mobile App: Use of mobile payments and loyalty programs to drive customer retention and sales through personalized offers.

2. Xiaomi's IoT Strategy: Integration of IoT in smart home devices and wearables to create a connected ecosystem for consumers.

Unit III - Digital Business Ecosystem (08 Hours)

Digital Commerce Mechanisms - Online Purchasing, E-Marketplaces, Digital Twins, Types - B2B, B2C, C2C, Multi-Sided Platforms, Disintermediation, Reintermediation, Platform Economy, Commerce Mechanisms - Webstores, Malls, Portals, Mobile Apps, Voice Commerce, Intermediaries - Aggregators, Curators, Merchant Solutions - Electronic Catalogs, Search Engines, Recommendation Systems, Shopping Carts, Auctions - E-Auctions, Algorithmic Pricing, Supply Chain - Blockchain, 3D Printing, Just-in-Time Delivery, Digital Payments - Mobile Payments, Digital Wallets, Cryptocurrencies, CBDCs, Security Privacy, Ethical Issues

Case study

1. Alibaba's E-Marketplace: How Alibaba uses its platform to connect buyers and sellers globally, leveraging blockchain for supply chain transparency.
2. eBay's Dynamic Pricing: Implementation of e-auctions and algorithmic pricing to optimize seller outcomes and buyer satisfaction.

Unit IV - Digital Business Applications (08 Hours)

Electronic Retailing - D2C, Omnichannel Retailing, AI-Driven Personalization, Social Shopping - User-Generated Content, Social Proof, Reviews, Stories, Fintech - E-Banking, Mobile Banking, Neobanks, Insurtech, Open Banking, Regtech - Digital Government - Smart Cities, E-Governance, Data-Driven Policy Making, Digital Public Services, E-Learning and EdTech - Online Platforms, Corporate Training, Gamification, VR/AR in Education, Digital Content - Streaming Services, Podcasts, Content Monetization.

Case study :

1. Revolut's Fintech Disruption: How Revolut uses mobile banking and open banking to challenge traditional financial institutions.
2. Coursera's EdTech Growth: Leveraging online platforms and gamification to deliver scalable education globally.

Learning Resources

Text Books

1. "Digital Business and E-Commerce Management" by Dave Chaffey, Tanya Hemphill, and David Edmundson-Bird, 7th Edition, Pearson, 2019.
2. "E-Commerce 2023: Business, Technology and Society" by Kenneth C. Laudon and Carol Guercio Traver, 18th Edition, Pearson, 2023.
3. "Platform Revolution: How Networked Markets Are Transforming the Economy" by Geoffrey G. Parker, Marshall W. Van Alstyne, and Sangeet Paul Choudary, W.W. Norton & Company, 2016.
4. "Mobile Commerce: Opportunities, Applications, and Technologies" by Paul May, Cambridge University Press, 2020.

Reference Books

1. "Social Commerce: Marketing, Technology and Management" by Efraim Turban, Judy Whiteside, David King, and Jon Outland, Springer, 2016.

2. "Fintech: The Technology Driving Disruption in the Financial Services Industry" by Parag Y. Arjunwadkar, CRC Press, 2018.

3. "The Future of Learning: EdTech in the Digital Age" by Cathy N. Davidson, MIT Press, 2022.

4. "Digital Health: Understanding the Benefits and Challenges" by Eric D. Perakslis, Oxford University Press, 2021.

5. "Entertainment in the Digital Age: Media, Technology, and Culture" by Robert C. [illegible], Bloomsbury Academic, 2020.

E-Books:

1. "The Lean Marketplace: A Practical Guide to Building a Successful Online Marketplace Business" by Juho Makkonen and Cristóbal Gracia (Lean Marketplace Press, 2018).

MOOC / NPTEL/YouTube Links:

1. https://onlinecourses.nptel.ac.in/noc23_mg44/preview

[illegible] University		
[illegible] : Digital Business and Technology		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CIE : 25 Marks End Semester: 25 Marks

Course Objectives: The course aims to:

1. To UNDERSTAND digital transformation and its impact on business
2. To UNDERSTAND Digital Business Model Innovation, Learn Through Real-World Case Studies
3. To UNDERSTAND how automation supports to enhance digital business.
4. To APPLY digital marketing strategies (SEO, social media), and emerging tech (AI, IoT)

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1 UNDERSTAND the concept of Digitization, Impact of Digital Marketing, processes, and strategies.
- CO2 COMPARE digital business models using case studies.
- CO3 IMPLEMENT basic automation tools in business workflows.
- CO4 UNDERSTAND the Role of Technology in Startups and Evaluate E-commerce Platforms.

Course Contents
Unit I Introduction to Digital Business (07 Hours)

Introduction to digitization, impact of digitization on business. Social media marketing, digital business models, concept of digital marketing and it's impact. Digital strategy and innovation.

Case Study: Sell products online via platforms like Amazon, Flipkart, and Shopify, reaching global customers 24/7

Unit II - Digital Business Model (07 Hours)

Introduction to digital business model innovation, key drivers of digital business model innovation, types of digital business model, case study on anyone renowned business organization.

Case study : Subscription-based streaming, original content production, personalized recommendations using AI

Unit III - Business Automation and Cyber Security (08 Hours)

Introduction to Automation in Digital Business, Role of Automation, Automation Technologies, Automation Implementation and Integration, Impact of Automation on Digital Business. Introduction to Cyber security, Cyber security Measures and Best Practices.

Case study

Unit IV - Emerging Tech and Entrepreneurship (08 Hours)

Role of technology in modern startups, Digital marketing fundamentals: SEO, social media, email Marketing E-commerce platforms and tools (Shopify, Woo Commerce, etc.), Introduction to AI, IoT, and Block chain in startups.

Case study: Automate tasks, analyze data, personalize user experiences, and develop smart products.

Learning Resources
Text Books:

1. Stephanie Diamond, "Digital Marketing All in One for Dummies".

2. Pradip Thomas, "Digital India : Understanding Information, Communication and Social Change"

3. George Westerman, Didier Bonnet, and Andrew McAfee , "Leading Digital : Turning Technology into Business Transformation" , Harvard Business Press.

4. [illegible], "Digital Marketing" , [illegible] Publication

[illegible] University		
[illegible] : Personal Financial Management		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : 15 Marks End Semester : 35 Marks

Course Objectives: The course aims to:

1. Introduce students to essential concepts of personal finance, budgeting, and savings.
2. Equip students with knowledge of banking, credit, and responsible borrowing.
3. Enable students to understand and evaluate investment and insurance options.
4. Foster informed financial decision-making for future financial security.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1. Create a personal budget and set realistic financial goals.
- CO2. Use and utilize banking services and credit facilities securely.
- CO3. Identify and evaluate appropriate saving and investment options.
- CO4. Apply basic tax planning and insurance knowledge for future financial stability.

Course Contents
Unit I : Introduction to Personal Finance and Budgeting (07 Hours)

a) Importance and scope of personal financial management
b) Financial goal setting: short-term, medium-term, and long-term goals
c) Personal income and expenditure planning
d) Budgeting techniques and tracking tools (manual and digital)
e) Emergency fund planning
f) Understanding financial discipline and behavioural aspects of money

Unit II : Banking, Credit, and Digital Finance (07 Hours)

a) Basics of banking: types of accounts, bank statements, interest
b) Digital banking tools: UPI, NEFT, RTGS, mobile banking, e-wallets
c) Credit and debit cards: responsible use and differences
d) Loans: student, personal, and vehicle loans
e) Credit score: concept, importance, and factors
f) Digital security: phishing, fraud prevention, and cyber hygiene

Unit III : Saving and Investment Options (08 Hours)

a) Importance of saving and types of saving schemes (FD, RD, PPF, etc.)
b) Introduction to investment: risk vs. return
c) Overview of mutual funds and SIPs
d) Concept of compounding and time value of money
e) Investment avenues: gold, real estate, stock market (basic concepts only)
f) Introduction to financial planning apps/tools

Unit IV : Insurance, Tax Basics, and Retirement Planning (08 Hours)

a) Concept and types of insurance: life, health, and general
b) Nomination and claims: processes and importance

c) Basics of income tax: slabs, 80C, and tax saving instruments
d) Retirement planning: PPF, NPS, and pension schemes
e) Common financial frauds and safety tips
f) Ethical financial behavior and long term wealth planning

Learning Resources

Text Books

1. Introduction to Personal Finance – C. Jayapalan (Himalaya Publishing House)
2. Financial Planning – S.S. Raman (United Publishers)
3. Personal Finance in India – B. Sreeram, Cengage Learning

Reference Books

1. Personal Finance by Jack R. Kapoor, Les R. Dlabay and Robert J. Hughes, Tata McGraw Hill Publishing Company Ltd. New Delhi.
2. Financial Education by Reserve Bank of India – rbi.org.
3. Personal Finance columns in The Economic Times, The Business Line and Financial Express Daily News Papers.
4. Information Brochures of Post Offices, Banks, Mutual Funds, Insurance Companies

Web tools :

1. Investopedia, Moneycontrol
2. SIP calculators, credit score checker (CIBIL demo)
3. UPI demo app (Google Pay / PhonePe for practice)
4. Internet Sources: RBI, SEBI, IRDA, NSE, BSE, NPCI etc.

MOOC / SWAYAM/ NPTEL Courses

1. Behavioral And Personal Finance – Course

Savitribai Phule Pune University		
[illegible] : Wine Technology		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : 15 Marks End Semester: 35 Marks

Course Objectives: The course aims to:

1. Understand the history, classification, and global significance of wine.
2. Explain the wine production process from grape harvesting to aging and bottling.
3. Analyze the economic impact, trade dynamics, and marketing strategies of the wine industry.
4. Explore emerging trends, sustainability practices, and career opportunities in wine making.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Demonstrate knowledge of winemaking techniques: fermentation and maturation.
- CO2: Assess grape varieties, wine quality, flavor profiles used in different wine types.
- CO3: Introduce students to the sensory and quality aspects of wine production, including the sensory tests and storage & containers.
- CO4: Evaluate wine business strategies, tourism models, and consumer preferences.

Course Contents
Unit I: Introduction to Wine, Winemaking and viticulture (08 Hours)

Introduction to different beverages, concept of wine, Health Benefits of wine, History & Evolution of Winemaking Major Wine Producing Regions, Wine Classification & Types (Red, White, Rosé, Sparkling, Fortified), Basic Winemaking Process and important terminologies of wine, Importance of Grapes in Winemaking, Grape Varieties & Their Impact on Wine Quality, Global Wine Industry Overview

Unit II : Wine Production & Technology (08 Hours)

Wine Making Process I (Pre fermentation): Harvesting of grapes, crushing, preparation and correction of must, maceration, Wine Making Process II (Fermentation process): Concept of fermentation, types and parts of fermenter, parameters affecting fermentation, Wine Making Process III (Post fermentation): Flavour enhancement and aging of wine, barrel aging and maturation in barrels, quality control, bottling and cellar system.

Unit III: Sensory Analysis & Quality Control (07 Hours)

Sensory evaluation and terminology, Human sensory organs and perception, Sensory Attributes of Wine : Appearance, Aroma, Mouth feel, Glassware Selection and Preparation for wine tasting, Storage and handling of wine. Types of sensory tests: discrimination, descriptive, hedonic. Common Off-Flavours and Defects in wine

Unit IV : Wine Economics & Trade (07 Hours)

Role of Wine in Hospitality & Tourism, Wine Tourism Destinations & Business Models, Global Wine Market Trends, Career Opportunities in the Wine Industry

Learning Resources:
Text Books:

1. Ronald S. Jackson (2002) Wine Tasting a professional handbook

2. Ron s. Jackson (2000) Wine science principles practice & perception

3. Vine, Richard p (1997) Wine Appreciation

4. Emile Peynaud (1987) The taste of wine

5. Bruce W. Zoecklein, Kenneth Fugelsang, Barry H. Gump Fred S. Nury (1995) Wine Analysis and Production

[illegible] University		
OEC-[illegible] : Dairy Technology		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CIE : 15 Marks End Semester : 35 Marks

Course Objectives: The course aims to:

1. Equip the students with the knowledge and professional skills necessary to understand and apply principles of milk and milk processing in Dairy industry.
2. Inculcate the knowledge and importance of quality control and preservation in Dairy industry.
3. Make aware of milk spoilage and preservation techniques used in dairy industry.
4. Discuss important case studies in dairy industry.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Acquire the knowledge about the opportunities in dairy field.
- CO2: Develop skills of milk and milk product processing.
- CO3: Understand the causes of milk spoilage, various preservation techniques, quality standards in dairy industry.
- CO4: Acquire the knowledge and present case studies based on important aspects in dairy industry.

Course Contents
Unit I: Livestock diversity and its Management: (07 Hours)

Livestock diversity in India and its importance, Role of livestock in Agriculture, Selection of dairy animals, Characteristics of ideal dairy farm, Management of milking animals, Animal health management and its impact on milk quality, Milking systems and hygienic milk production.

Unit II - Milk Process Technology: (07 Hours)

Nutritional importance of milk and its constituents, Collection methods of raw milk and its impact on milk quality, Method of Sampling of raw milk, Quality assessment of raw milk, Processing of milk and its significance: cooling, separation, standardization, homogenization and pasteurization and its types. Types of milks and its production: pasteurized, standardized, toned, double toned, flavored milk. Production of milk products: Yogurt, butter, buttermilk, paneer, Dairy plant hygiene and sanitation, disposal of dairy waste.

Unit III - Quality Assurance of Milk: (08 Hours)

Spoilage of milk and milk products by microorganisms and its control, Different packaging Materials, importance of packaging in milk and milk product preservation, Quality assurance of dairy products: Quality assurance (ISO 9001:2000) and food safety system (HACCP), Quality assessment of milk, detection of adulteration.

Case study: The most effective ways of packing milk and the types of paper used and quality check.

Unit IV: Case Studies in Dairy Technology: (08 Hours)

Case study: Butter, Cheese and Paneer technology and Business Models, Ice cream and Frozen desserts, Packaging of Dairy products, Refrigeration and Air conditioning, Human Nutritional Characteristics.

Learning Resources

Text Books

1. Outlines of Dairy Technology , Sukumar De, Oxford University Press 2010
2. Technology of Milk processing: Khan QA and Padmanabhan, ICAR, New Delhi.
3. Principle of Dairy Processing: J. N. Warner, Wiley Eastern Ltd. New Delhi.
5. A Text Book of Dairy Engineering: A.N. Hall
5. Engineering for Dairy and Food Products , A.W. Farrall
6. Food Engineering and Dairy Technology , Prof. H.G. Kessler
7. Modern Dairy Technology Vol I & II, R.K. Robinson
8. Dairy Technology and Engineering, Harper and Hall
9. Dairy Processing Technology, Ahuja, K.P.S (2012)
10. Robinson, R.K. (1990) Dairy Microbiology. The microbiology of milk, Applied Science publisher, London.
11. Pasteurized Milk Ordinance (PMO), Potter N., Hotchkiss, J. H., 1995. Milk and milk products. In: Food Science, 5th Edition, Chapman
12. Fundamentals of Dairy Microbiology , J.B. Prajapati

[illegible] University		
[illegible] : Supply Chain Management		
Teaching Scheme	Credits	Examination Scheme
Theory : [illegible] Hours/Week	[illegible]	CIE : [illegible] Marks End Semester: [illegible] Marks

Course Objectives: The course aims to:

1. To gain an understanding of how supply chain structure work for smooth transition.
2. To become familiar with flow of supply chain and its management.
3. To study the supply chain management building blocks.
4. To study the customer requirements and expected services.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Describe the structure of Supply Chain Management
- CO2: Identify the various flows in real world supply chains
- CO3: Understand the key Operational Aspects in Supply Chain Management
- CO4: Evaluate the relationship between Customer Value and Supply Chain Management

Course Contents

Unit I : Supply Chain Structure & Flow (07 Hours)

Shift from enterprise to network, Structure of a SC, Push based SC, Pull based SC, Tradeoff between Push & Pull, Identifying appropriate Push & Pull strategy for SC, Commodity & cost centric SC, Agile, Forward & Reverse SC, Product, Services, Information, Funds, Demand, Forecast flows in Up-stream & Downstream direction

Unit II: Total Supply Chain management (07 Hours)

Business landscape – driving forces: Shift from Operations to Services, Impact of globalization & technological revolution, shift from linear SC to collaborative networks, power shifts in the SC, demands for flexibility of partnerships, cost compression, growth in outsourcing.

Unit III : Supply Chain management Building Blocks (08 Hours)

Overview of customer focus & demand, resource & capacity management, procurement & supplier focus, inventory management, operations management, distribution management in SCM

Unit IV: Customer Value (08 Hours)

Empowered customer, Customer focused Marketing & SC service outputs, customer service – availability, operational performance, reliability. Customer satisfaction – customer expectations, enhancing customer satisfaction, limitations of customer satisfaction. Customer success – achieving customer success, value added services, customer value requirement mapping

Learning Resources:

Text Books:

1. Supply Chain & Logistics Management, Bowersox, Closs & Cooper, Tata McGraw Hill
2. Designing & Managing the SC – Concepts, Strategies & Case studies, Levi, Kaminsky et. al, Tata McGraw Hill

2. Supply Chain Management: Strategy Planning & Operations, Sunil Chopra, Peter Meindl, Pearson

Reference Books:

1. Supply Chain Management: Process, System & Practice, Chandrasekaran, Oxford
2. Retail Supply Chain Management, Ross & Wright, Elsevier
3. Logistics Management & Strategy, Harrison and van Hoek, Prentice Hall
4. Supply Chain Management, Mentzer, Response Books
5. Logistics Management: The Supply Chain Imperative, Vinod Sople, Pearson Education

[illegible] World Peace University		
[illegible] : Digital Manufacturing		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : [illegible] Marks End Semester : 25 Marks

Course Objectives: The course aims to:

1. To understand the basic concepts modern digital factories and their design.
2. To understand digital twin technology and its applications.
3. To understand engineering knowledge management and its application.
4. To analyze the supply chain strategies and modern security for digital manufacturing.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Understand the fundamentals of digital manufacturing, concept design of 3D digital factory.
- CO2: Perception on digital twin, its implementation and cyber physical integration.
- CO3: Develop concept of engineering knowledge management along with case studies.
- CO4: Conceptualize business models and supply chain strategies, different security systems.

Course Contents

Unit I : 3D Digital Factories (07 Hours)

The promise of 3D Digital factories, Embracing digital design and new workflows, 3D additive printing, An integration of operational and information technologies, Conceptual design of a 3D digital factory.

Unit II : Digital Twin Technology (07 Hours)

Production planning and scheduling in a smart factory, Concept of digital twin, Cyber physical integration, Implementing digital twin, Industrial case studies, Smart production resource allocation.

Unit III : Engineering Knowledge Management (08 Hours)

Knowledge discovery and extraction, Knowledge representation and reasoning, Construction of the industrial knowledge graph, Knowledge graph enabled knowledge endeavours, Industrial case studies.

Unit IV : Business Models, Supply Chain Strategy and Security Aspects (08 Hours)

Business models for the new enterprise, Supply chain strategies, Additive manufacturing and supply chain resiliency, Design customization and optimization, Risks and threats to distributed digitized manufacturing, Modern security for digital manufacturing.

Learning Resources

Text Books:

1. Chandrakant D. Patel (Editor), Chun-Hsien Chen (Editor), "Digital Manufacturing: Key Elements of a Digital Factory, Elsevier - Health Sciences Division, 2021
2. [illegible], "Practical Guide to Digital Manufacturing", Springer Nature Link, 2021

3. Zude Zhou, Shane (Shengquan) Xie, Dejun Chen, "Fundamentals of Digital Manufacturing Science", Springer-Verlag London Limited 2012.

4. [illegible] (Editor), [illegible] (Editor), "Smart Digital Manufacturing: A Guide for Digital Transformation with Real Case Studies Across Industries", Wiley VCH, 1st Edition, Germany 2020.

Reference Books:

1. Kaushik Kumar (Ed.), Divya Zindani (Ed.), J. Paulo Davim (Ed.), "Digital Manufacturing and Assembly Systems in Industry 4.0 (Science, Technology and Management)", CRC Press, 1st Edition, CRC Press, 2019.

2. Sita Rani, Pankaj Bhambri, Sachin Kumar, Piyush Kumar Pareek, "AI-Driven Digital Twin and Industry 4.0", 1st Edition, CRC Press, 2024.

3. James W. Cortada, "The Digital Hand: How Computers Changed The Work of American Manufacturing, Transportation, And Retail Industries", Oxford University Press, 1st Edition, 2003.

E-books Links:

1. https://[illegible]/e-book-inspiration-to-implementation-of-digital-manufacturing/
2. https://www.[illegible]/book/digital-manufacturing-automation-[illegible]
3. https://www.routledge.com/Digital-Manufacturing-and-Assembly-Systems-in-Industry-40/Kumar-Zindani-Davim/p/book/[illegible]
4. https://onlinelibrary.wiley.com/doi/abs/10.1002/[illegible]
5. api.pageplace.de/preview/[illegible]
6. https://www.[illegible]/books/reprint/[illegible]-smart-manufacturing
7. https://onlinelibrary.wiley.com/doi/book/10.1002/[illegible]

MOOC/SWAYAM/NPTEL Courses:

1. https://www.coursera.org/specializations/digital-manufacturing-design-technology
2. https://[illegible]/course/digital-manufacturing-smart-factories-[illegible]
3. https://onlinecourses.nptel.ac.in/noc21_[illegible]/preview
4. https://professionalprograms.mit.edu/online-program-smart-manufacturing/
5. https://www.buffalo.edu/[illegible]/professional-education/course-list/digital-manufacturing-and-design-[illegible].html

Savitribai Phule Pune University, Pune

Maharashtra, India

Semester - IV

Open Elective - II		
Course Code	Offering Faculty	Course Name
OE-2XX	Interdisciplinary Studies	Project Management
OE-2XX	Science	Optimization Techniques
OE-2XX	Management	Principles and Practices of Management
OE-2XX	Commerce	Personal Management
OE-2XX	Management	Business Essentials for Rural Development
OE-2XX	Science	Nanoscience and Nanotechnology
OE-2XX	Interdisciplinary Studies	Industrial Organization Management
OE-2XX	Science	Statistical Analysis
OE-2XX	Interdisciplinary Studies	Mobile Innovation

With effect from Academic Year 2021-22

Savitribai Phule Pune University		
[illegible] : Project Management		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : 15 Marks End Semester: 35 Marks

Prerequisite Courses, if any:

1. Programming and Problem Solving

Course Objectives: Students will be familiarized with

1. Fundamental principles of project management
2. Project planning, organizing, and controlling the projects
3. Skills in project scheduling, budgeting, and resource allocation
4. Risk management, quality control, and stakeholder management in projects
5. Project management concepts to real world scenarios.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Explain the principles of project management
- CO2: Use project management concepts to real-world scenarios
- CO3: Apply Agile Project Management
- CO4: Discuss the importance of risk management, quality control, and stakeholder management in projects
- CO5: Demonstrate skills in project planning, execution, and control

Course Contents
Unit I- Introduction to Project Management (07 Hours)

Project Definition, Project Life Cycle, processes and knowledge areas in Project management, WBS and its types, introduction to PMBOK, portfolio Management, Traditional Vs Modern Project using PMBOK Concept

Case Study: Online Shopping

Unit II- Agile Software Development (07 Hours)

Introduction, Agile methods, Scrum, Comparison between Non Agile and Agile Project, Three stages of Agile Project, Plan driven and Agile Development, Extreme programming, scaling agile methods, Roles and responsibilities, Scheduling and tracking.

Case Study : Analyse the same project using Agile. Create the three stages of the project

Unit III- Project Planning and Management (08 Hours)

Introduction to project planning, Project planning process, Agile project management, Gantt Chart, PERT chart, CPM, Microsoft Projects, and Primavera Project Management Software, Role of Project Manager, Objectives of Activity planning, Project Schedules, Activities, Sequencing and Scheduling.

Case study: Develop the Software project plan using Microsoft Projects or any open source tool like Jira, Kanban, extreme programming

Unit IV - Project Execution and Control (08 Hours)

Project execution: task assignment, tracking, and monitoring - Project control: schedule control, budget control, and quality control - Earned value management (EVM) and project performance measurement - Project reporting and communication

Risk management principles and concepts - Risk identification, analysis, and prioritization - Risk response planning and implementation - Risk monitoring and review

Learning Resources

Text Books:

1. "Project Management: The Managerial Process" by Erik W. Larson and Clifford F. Gray.
2. "Project Management: A Systems Approach to Planning, Scheduling, and Controlling" by Harold Kerzner
3. "Project Management for Engineering, Business, and Technology" by John M. Nicholas & Herman Steyn
4. Roger Pressman, "Software Engineering: A Practitioner's Approach", McGraw Hill, ISBN 0-07-337597

Reference Books:

1. "A Guide to the Project Management Body of Knowledge (PMBOK Guide)" by Project Management Institute (PMI)
2. "The Fast Forward MBA in Project Management" by Eric Verzuh
3. Pankaj Jalote, "An Integrated Approach to Software Engineering", Springer, ISBN 13: 9788173192715.
4. S.K. Chang, "Handbook of Software Engineering and Knowledge Engineering", World Scientific, Vol I, II, ISBN: 978-981-02-4973-1

MOOC / NPTEL/YouTube Links:

1. https://onlinecourses.swayam2.ac.in/cec20_cs07/preview
2. https://onlinecourses.nptel.ac.in/noc24_mg01/preview

Online Links:

- https://www.atlassian.com/work-management/project-management
- https://www.[illegible].com/project-management
- https://ebookpdf.com/roger-s-pressman-software-engineering

Savitribai Phule Pune University		
[illegible] : Optimization Techniques		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : 15 Marks End-Semester: 35 Marks

Prerequisite Courses:

1. Basic knowledge of mathematics and programming

Course Objectives: The course aims to:

1. Understand the fundamental principles and classifications of mathematical optimization problems.
2. Formulate real-life and engineering problems as mathematical models.
3. Apply classical and modern optimization techniques such as linear programming, nonlinear optimization, and integer programming.
4. Use heuristic and evolutionary algorithms to solve complex optimization problems relevant to AI and ML.
5. Analyze optimization models and evaluate solutions using appropriate tools and techniques.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Define and classify various types of optimization problems in mathematical form.
- CO2: Apply graphical and simplex methods to solve linear programming problems.
- CO3: Apply optimization techniques to solve Transportation and Assignment problems.
- CO4: Solve non-linear problems through Kuhn-Tucker theory.
- CO5 : Calculate numerical solution using various theoretical techniques.

Course Contents
Unit I - Basic Concepts (07 Hours)

Historical Development, Engineering applications of Optimization, Formulation of real-life problem as mathematical models.

Case Study: Job scheduling in IT systems, Cost minimization in cloud services

Unit II - Linear Programming (07 Hours)

Standard form of linear programming (LP) problem, Canonical form of LP problem, Assumptions in LP Models, Elementary operations, Graphical method for two variable optimization problem, simplex method, Dual Simplex method

Case Study : Resource allocation in IT projects, Manpower scheduling, Karmarkar's projective scaling method

Unit III: Linear Programming Applications (08 Hours)

Sensitivity analysis, Transportation and Assignment Problems

Case study: Use of software for solving linear optimization problems using graphical and simplex methods

Unit IV: Numerical Optimization Techniques (08 Hours)

Basic theory, Method of Lagrange Multipliers, Karush-Kuhn-Tucker Theory, Convex optimization, line search methods, gradient methods, Newton's method, Conjugate direction methods, Quasi-Newton methods, Projected Gradient Methods

Case study: Use of software for Karush-Kuhn-Tucker theory Numerical calculations using software

Learning Resources:

Text Books:

1. S.S. Rao - Engineering Optimization: Theory and Practice
2. Kalyanmoy Deb - Optimization for Engineering Design

Reference Books:

1. Hamdi Taha - Operations Research
2. Chong and Zak - An Introduction to Optimization
3. Nocedal & Wright - Numerical Optimization

E-books Links:

1. Introduction to Optimization – MIT OpenCourseWare
2. Numerical Optimization – SpringerLink (online academic access)

MOOC/ SWAYAM/ NPTEL Courses:

1. https://archive.nptel.ac.in/courses/111/[illegible]
2. https://onlinecourses.nptel.ac.in/[illegible]/preview
3. SWAYAM – Optimization for Machine Learning

Savitribai Phule Pune University		
[illegible] : Principles and Practices of Management		
Teaching Scheme	Credits	Examination Scheme
Theory : 03 Hours/Week	03	CIE : [illegible] Marks End-Semester: [illegible] Marks

Prerequisite Courses:

1. Organizational Behavior, Fundamentals of Management

Course Objectives: The course aims to:

1. To PRESENT a problem oriented in depth knowledge of Principle of Management.
2. To FOCUS students with a working knowledge of the skills and functions necessary to be an effective, efficient manager, leader with effective decision making.
3. To ADDRESS the concepts and methods behind motivation and effective communication for solving real problems.
4. To EXAMINE the management functions (planning, organizing, leading or influencing, and controlling) and the impact of these functions on the business organization.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: UNDERSTAND how essential various functions of management are for every business manager.
- CO2: APPLY the principles of management to the practical situations concerning the management of people and organizations and decision making in real business life.
- CO3: DEVELOP effective communication and motivating abilities to solve real life problems.
- CO4: PLAN and DEVELOP strategies for effective decision making under critical condition.

Course Contents
Unit I - Introduction to Management and Organization (07 Hours)

Management: Definition of Management, Nature, Scope, Purpose, Characteristics and Functions of Management. Evolution of Scientific Management, Modern Management, Principles of Management. Organization: What is Organization, Organizational Structure, Need and Purpose of Organization, Types of Organization.

Real World Assignments

1. Presentation on: Principles of Management by Different Management Gurus
2. Visit and Report to Understand Organizational Structure with Role and Responsibility of each Post/Designation

Case Study: Business management in manufacturing firms; Project management in construction; Organizational design in IT companies; Human resource management in startups; Operations management in service industries

Unit II - Managers, Leadership and Decision Making (07 Hours)

Managers: Who is a Manager?: Roles of a Manager, Skills of an Effective Manager, Functions of a Manager

Leadership: Defining leadership and its role; leadership Style; Leadership Development; Leadership Initiatives

Decision Making: Nature and Process of Decision Making; Decision Making under Certainty and Uncertainty; Decision Making Steps & Processes, Brain storming

Real World Assignment : Real Life Case Which will Lead to Evolve Leadership and Decision Making Ability Among the Students

Examples / Practical Applications : Corporate management roles; Team leadership in project management; Executive decision making in startups; Human resource leadership development; Strategic planning in organizations

Unit III - Motivation and Communication (08 Hours)

Motivation: Concept, Theories – Classical and Modern, Importance, Financial and Non-financial Motivation, Positive and Negative Motivation, Group Motivation.

Communication: Definition, Meaning, Nature, Communication Process, Types and Barriers to Communication.

Real World Assignment: To understand Motivational and Effective Communication Strategies of any Ongoing Project Related to Mechanical Industry (Case Study Based Approach)

Examples / Potential Applications: Employee motivation programs; Organizational behavior management; Leadership and team motivation; Corporate communication strategies; Change management and internal communication

Unit IV - Planning and Strategic Management (08 Hours)

Planning: Why Management Process starts With Planning, Steps in Planning, Planning Premises, Types of Planning, Barriers to Effective Planning, Operational Plan, Strategic Planning, McKinsey's 7S Approach, SWOT Analysis.

Strategic Management : Meaning, Definition, Elements, Scope and Dimensions, Process, Importance, Strategic Decisions

Real World Assignment - Design Production Planning System for Manufacturing Industry / Case of Manufacturing Industry focusing on different functions such as Demand Forecasting, Production Scheduling, Material Management, Capacity Planning, Monitoring and Control

Examples / Practical Applications : Corporate strategic planning; Business operations management; Project planning and execution; SWOT analysis in market research; Strategic decision making in startups

Learning Resources

Text Books:

1. Industrial Engineering and Management, Dr. O P Khanna, Dhanpat Rai and Publication, New Delhi
2. Industrial Engineering and Management, Banga and Sharma, Khanna Publication, New Delhi
3. Principles of Engineering Management, Julian Ee, Springer
4. Management Principles Process and Practices by Anil Bhat, Arya Kumar Oxford Latest Edition
5. Principles and Practices of Management by Shejwalkar and Ghanekar Tata McGraw Hill Latest Edition

Reference Books:

1. Prasad, L.M., Principles and practice of Management, Sultan Chand & Sons
2. Gupta, R.N., Principles of Management, Sultan Chand & Co
3. Vikash Kumar, Principles and practice of Management, Laxmi Publication
4. J S Mitra, Principles and practice of Management, Oxford
5. T. Ramasamy, Principles of Management, Himalaya Latest Edition

E Books Links:

1. https://onlinecourses.nptel.ac.in/noc24_mg07/preview
2. https://archive.nptel.ac.in/courses/[illegible]/
3. https://www.youtube.com/watch?v=[illegible]
4. https://www.youtube.com/playlist?list=[illegible]

[illegible] University		
[illegible] : Financial Management		
Teaching Scheme	Credits	Examination Scheme
Theory : 03 Hours/Week	03	CIE : [illegible] Marks End Semester: [illegible] Marks

Prerequisite Courses, if any:

1. Engineering Economics / Basic Economics (recommended).
2. Business environment and economic systems (recommended).

Course Objectives: The course aims to:

1. To introduce engineering students to the fundamental concepts of financial management.
2. To develop an understanding of financial statements and basic financial decision-making.
3. To equip students with tools to evaluate investment and financing options.
4. To enhance skills in applying financial principles to technical projects and business scenarios.
5. To create financial awareness useful in entrepreneurial or managerial roles.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Understand key concepts and functions of financial management (BTL 2)
- CO2: Apply time value of money techniques and capital budgeting tools (BTL 3)
- CO3: Analyze financial statements using ratio analysis (BTL 4)
- CO4: Evaluate working capital needs for various business scenarios (BTL 5)
- CO5: Identify and classify sources of finance and understand basic cost of capital (BTL 2)

Course Contents
Unit I: Introduction to Financial Management (07 Hours)

- Nature, scope and functions of financial management
- Objectives: Profit vs. Wealth Maximization
- Role of Finance Manager
- Types of business finance: Equity, Debt, Internal financing
- Importance of finance for engineers and startups

Case Study: Role of finance in a tech startup, Real-world examples of financial decision making in engineering firms.

Unit II : Time Value of Money & Capital Budgeting (07 Hours)

- Concept and significance of Time Value of Money
- Present Value (PV) and Future Value (FV) techniques
- Simple capital budgeting tools: Payback Period, ARR, IRR, NAB, PI.
- Engineering project investment evaluation examples Case study: NPV calculation for a solar plant project. Payback period for a manufacturing automation upgrade

Unit III: Financial Statements & Ratio Analysis (08 Hours)

- Introduction to financial statements: P&L, Balance Sheet, Cash Flow Statement
- Key ratios: Liquidity, Profitability, Solvency, Turnover Ratios.
- Simple analysis and interpretation of company annual reports with the help of ratio analysis

Case study: Ratio analysis of a listed engineering company. Balance sheet reading for a medium-sized manufacturing firm.

Unit IV: Applications (08 Hours)

- Concept and importance of working capital
- Components: Inventory, Receivables, Payables
- Operating cycle and estimation of working capital
- Applications in manufacturing and service industries
- Numericals on Working Capital Management
- Numericals on Working Capital Requirement
- Sources of Finance & Cost of Capital
  - Classification of sources: Short-term and Long-term
  - Equity, Debt, Preference, retained earnings, Preference shares
  - Introduction to Cost of Capital: Concept of WACC
  - Role of Banks, financial institutions, and capital markets

Case study:

- Working capital analysis for a construction project
- Inventory management for a robotics company
- Funding mix for an electric vehicle startup
- WACC calculation for capital budgeting decision

Learning Resources:

Text Books:

- I.M. Pandey, Financial Management
- Prasanna Chandra, Financial Management
- Financial Management by I.M. Pandey, Vikas Publishing House
- Financial Management by Kishore R., Taxmann Publications

Reference Books:

- Khan & Jain, Financial Management
- Van Horne, Financial Management and Policy
- Ross, Westerfield & Jordan, Corporate Finance

E Books Links:

- Financial Management eBook by SMRITI (pdf)

MOOC/SWAYAM/NPTEL Courses:

- Financial Management for Managers – NPTEL (Prof. [illegible], IIT [illegible])
- Basics of Financial Management – NPTEL (Prof. [illegible], IIT [illegible])

Savitribai Phule Pune University		
[illegible] : Business Essentials for Rural Development		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CCE : 15 Marks End Semester: 35 Marks

Prerequisite Courses:

1. Basic Understanding of Business Concepts, Knowledge of Rural Development Issues, Analytical Skills, Communication Skills, Critical Thinking

Course Objectives: The course aims to:

1. To introduce the fundamental concepts of business and entrepreneurship with a focus on rural development.
2. To understand the structure, challenges, and opportunities of rural markets and rural enterprises.
3. To enable students to explore business models and government schemes that promote rural entrepreneurship.
4. To develop problem-solving and planning skills for designing sustainable rural business ventures.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1. Understand the dynamics of rural markets and the importance of rural business development.
- CO2. Apply entrepreneurial principles to identify and evaluate rural business opportunities.
- CO3. Develop basic marketing, financial, and operational plans for rural enterprises.
- CO4. Connect rural business ideas with relevant government schemes and sustainability practices.

Course Contents
Unit I : Introduction to Business and Rural Economy (07 Hours)

a) What is business? Types and forms of business organizations
b) Role of business in economic development
c) Structure of the Indian rural economy and demographics
d) Characteristics of rural markets and consumers
e) Economic activities in rural areas: agriculture, cottage industries, services
f) Challenges in rural business development: infrastructure, education, finance

Unit II : Essentials of Entrepreneurship for Rural Development (07 Hours)

a) Definition and traits of an entrepreneur

b) Importance of rural entrepreneurship

c) Steps in setting up a small business in rural areas

d) Business idea generation and opportunity identification

e) Case studies of successful rural entrepreneurs and enterprises

f) Social entrepreneurship and community-driven models

Unit III - Marketing, Finance, and Operations in Rural Business (08 Hours)

a) Marketing mix (4Ps) and its relevance in rural markets

b) Rural marketing strategies: communication, pricing, and distribution

c) Basics of financial management: cost, revenue, profit, breakeven

d) Sources of finance: banks, microfinance, SHGs, NBFCs

e) Operational aspects: procurement, inventory, quality, workforce

f) Use of digital tools and mobile technology in rural business

Unit IV - Government Schemes, NGOs, and Sustainable Development (08 Hours)

a) Key government schemes for rural business (PMEGP, MUDRA, NRLM, etc.)

b) Role of NABARD, KVIC, and other rural support institutions

c) NGOs and their contribution to rural development

d) Sustainable development goals (SDGs) and rural empowerment

e) Role of engineering and innovation in solving rural problems

f) Project work: Designing a rural business plan or sustainable solution

Learning Resources:

Text Books:

1. Rural Development: Principles, Policies and Management Katar Singh, Sage Publications India
2. Rural Development in India: Past, Present and Future, Vasant Desai, Himalaya Publishing House
3. Rural Marketing, C.S. Rayudu, , Himalaya Publishing House
4. Rural Marketing in India, S.S. Acharya & N.L. Agarwal , Oxford & IBH Publishing Co. Pvt. Ltd.

Reference Books:

1. Social Entrepreneurship and Rural Development, Dr. P.C. Jain, Regal Publications
2. Rural Marketing, S.K. Jha, Prentice Hall India
3. Indian Economy By R. Datt & K.P.M. Sundharam, S. Chand Publishing
4. Rural Development: Some Grassroots Experiences Baldev Singh Rawat Publications

Government Resources:

1. Planning Commission / NITI Aayog Reports (e.g., Annual Reports on Rural Development Programmes, Strategy for New India @75)

2. Ministry of Rural Development (India) reports and updates on schemes like MGNREGA, PMGSY, NRLM Website: https://rural.nic.in

3. NABARD Publications: Annual reports, rural finance studies, SHG and microfinance data Website: https://www.nabard.org

4. National Institute of Rural Development and Panchayati Raj (NIRDPR): Research papers and training materials for rural development professionals Website: https://nirdpr.org.in

MOOC/SWAYAM/NPTEL Courses

1. Business Development: From Start to Scale - Course

Savitribai Phule Pune University		
OEL-[illegible] - Nanoscience and Nanotechnology		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CIE : 15 Marks End-Semester: 35 Marks

Course Objectives: The course aims to:

1. Introduce students with concepts of nano science and nanotechnology.
2. Understand synthesizing methods of microbial mediated metallic nanoparticles.
3. Learn fundamental characterization techniques of nanoparticles.
4. Study applications of nanotechnology in various fields.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Understand and differentiate fundamental characteristics of nanoscale particles in daily life.
- CO2: Identify appropriate microbial routes for synthesizing metallic nanoparticles.
- CO3: Understand and compare various characterization techniques for identification of nanoparticles.
- CO4: Apply knowledge of nanoscience and nanotechnology in various industrial applications.

Course Contents

Unit I - Introduction to Nanoscience and Nanotechnology (07 Hours)

Introduction to nanoscale, nanomaterials, nanoscience and nanotechnology. Nanoscale biostructures: Liposomes, viruses, DNA, polysaccharides and proteins (Protein nanotubes, nanofibers, peptide nanoparticles).

Unit II - Microbial mediated metallic nanoparticles synthesis (07 Hours)

Gold nanoparticles (AuNPs), Silver nanoparticles (AgNPs), Au-Ag alloy nanoparticles, Oxide nanoparticles: Magnetic nanoparticles, Non-magnetic oxide nanoparticles, Sulfide nanoparticles etc.

Unit III: Characterization Techniques for Nanomaterials - (08 Hours)

UV-visible spectroscopy, Fourier transform infrared (FTIR), X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM) and dynamic light scattering (DLS), Vibrating Sample Magnetometer (VSM), Introduction to Superconducting Quantum Interference Device (SQUID).

Unit IV - Applications of Nanotechnology (08 Hours)

Antibacterial agents, drug delivery, biosensors, animal industry and nanotechnology in wastewater treatment, biomedical applications of biomolecules, bioimaging and vaccine development.

Learning Resources

Text Books:

1. Introduction to Nanoscience and Nanotechnology" by Gabor L. Hornyak, Joydeep Dutta, H.F. Tibbals, and John J. Moore.
2. nanotechnology: Principles and Practices" by S.K. Kulkarni.
3. Doll T. A. P. F., Raman S., Dey R. and Burkhard P. (2013). Nanoscale assemblies and their biomedical applications. J R Soc Interface. 10: 20120740; http://dx.doi.org/10.1098/rsif.2012.0740
4. Gurunathan S., Kalishwaralal K., Vaidyanathan R., Venkataraman D., Pandian S. R. K.,
5. Muniyandi J., Deepak V. and Soo Hyun Eom. (2009). Biosynthesis, purification and characterization of silver nanoparticles using Escherichia coli. Colloids and Surfaces B, 74(1): 328-335.
6. Fariq A., Khan T. and Yasmin A. (2017). Microbial synthesis of nanoparticles and their potential applications in biomedicine. J. Appl. Biomed. 15: 241-248.
7. Li X., Xu H., Chen Z. S. and Chen G. (2011). Biosynthesis of nanoparticles by microorganisms and their applications. Journal of Nanomaterials. 2011.
8. Nanomaterials: Synthesis, properties and Applications. Edited by A. S. Edelstein & R. C. Cammarata, Institute of Physics Publishing, Bristol & Philadelphia.
9. Nanomaterials by A.K. Bandyopadhyay (2nd Edition), International Publishers.

Savitribai Phule Pune University		
[illegible] - Industrial Organization Management		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CIE : 15 Marks End-Semester: 35 Marks

Course Objectives: The course aims to:

1. To understand the basic concepts management quality of good leadership and teamwork, leadership skill, and industrial economics.
2. To explain the fundamentals of industrial economics and Management.
3. To analyze and differentiate between marketing management and financial management.
4. To understand business organization structure and ownership.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: Discuss the fundamentals of management, quality of good leadership and teamwork, leadership skill, and industrial economics.
- CO2: Explain the importance of quality, technology management and quality management.
- CO3: Analyze and differentiate between marketing management and financial management.
- CO4: Understand the difference between different types of business organizations, business ownership.

Course Contents
Unit I - Management, Industrial Economics and Leadership (07 Hours)

Management: Meaning, scope, function, and importance of management. Difference between administration and management.
Leadership: Importance, Types: Autocratic, Democratic and Laissez-faire Leadership, qualities of good Leader.
Industrial Economics: Definition, demand and supply concept, Law of demand and supply.

Unit II - Technology Management and Quality Management (07 Hours)

Technology Management & its Classification: Definition, application and its scope. Classification its importance on National Economy.
Quality Management: Definition Types, Quality of design, Seven QC Tools, Poka Yoke (Mistake Proofing), Quality circles, Kaizen: Meaning and implementation. TQM, 5S (Case study of Toyota, [illegible] movement), Six Sigma.

Unit III - Marketing and Financial Management (08 Hours)

Marketing Management: Meaning of Market, Marketing strategy, markets, types-Perfect Competition, Monopoly, Monopolistic competition and Oligopoly. Online Marketing (Digital Marketing).

Financial Management: Definition, Types of costs (Fixed, Variable, average, marginal, and total cost) and methods of costing price, capital. Debit, credit, Profit and loss statement, Balance sheet.

Unit IV - Business Organization, Business Ownership (08 Hours)

Business Organization: Line organization, Staff organization and Functional Organization.

Business Ownership and its Types: One person company, Types of ownership, Sole proprietorship, Partnership (Act 1932), LLP (Limited Liability Partnership) (Act 2008).

Entrepreneurship: Importance and limitations of rational decision making, Decision making under certainty, uncertainty and risk, Small and medium scale industries in India.

Learning Resources

Text Books:

1. O.P. Khanna, "Industrial Engineering and Management", Dhanpat Rai Publication, New Delhi, 2018.
2. P. H. Megrath, "Basic Managerial Skills for All", 9th Edition, Prentice Hall of India, New Delhi, 2011.
3. Tarek M. Khalil, "Management of Technology", McGraw Hill Publication, US, 1999.
4. Prabuddha Ganguli, "Intellectual Property Rights", McGraw Hill Publication, 2017.
5. M. Y. Khan and P.K. Jain, "Management Accounting", 8th Edition, McGraw Hill Publication, 2021.

Reference Books:

1. C. B. Mamoria and V. S. P. Rao, "Personnel Management", Himalaya Publishing House, 30th Edition 2011.
2. Philip Kotler et al., "Marketing Management", Pearson Edition 2008.
3. I. M. Pandey, "Financial Management", 11th Edition, Vikas Publishing House Pvt. Ltd., Delhi, 2015, Philip Kotler Marketing.
4. John M. Kelly, "Total Quality Management: How to Prepare for the High Performance Business", InfoTech Media, 2000.
5. Dale H. Besterfield and Carol Besterfield, "Total Quality Management", 5th Edition, Pearson Education, 2018.

E Books Links :

1. https://knowledgeplatform.dcheri.in/Record/TR-0000133986
2. https://www.bloomsbury.com/us/industrial-economics-9781349151080/
3. https://web.mail.neflo.hbs.edu/leadership-ebook

4. https://www.bloomsbury.com/uk/technology-management-[illegible]

5. https://[illegible]

6. https://open.umn.edu/opentextbooks/textbooks/introduction-to-intellectual-property-law

7. https://[illegible]

8. https://www.amazon.in/Marketing-Management-Kotler-Philip-Keller-ebook/dp/[illegible]

9. https://www.amazon.in/Fundamentals-Financial-Management-Chandra-Bose-ebook/dp/[illegible]

10. https://[illegible]

11. https://[illegible]Types_of_Business_Ownership.pdf[illegible]

YouTube Videos :

1. https://youtu.be/[illegible]

2. https://youtu.be/[illegible]

3. https://youtu.be/[illegible]

4. https://youtu.be/[illegible]

5. https://youtu.be/[illegible]

Savitribai Phule Pune University		
[illegible] : Business Analytics		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CIE : 15 Marks End Semester: 35 Marks

Course Objectives: The course aims to:

1. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.
2. To become familiar with the processes needed to develop, report, and analyze business data.
3. To gain knowledge of predictive and prescriptive analytics.
4. Explore applications in Marketing, Finance.

Course Outcomes: Upon successful completion of this course, students will be able to:

- CO1: To understand the Business Analytics in practice.
- CO2: Apply analytical thinking to business problems using tools like Excel, Tableau, etc.
- CO3: Use predictive and prescriptive methods like regression and optimization.
- CO4: Analyze real-world marketing and finance problems through analytics.

Course Contents

Unit I - Introduction to Business Analytics (07 Hours)

Definition of Business Analytics, Types of Analytics - Descriptive, Diagnostic, Predictive, Pre- scriptive, Concept of insights, Business Analytics in practice, Big Data - Overview of using Data, Importance of data in business analytics, Types of Data, Business decision modeling. Differences between data, information and knowledge, Quality of data, 5Vs of Big Data, Big Data Collection and Ethics, Data sources and collection methods, Data privacy, security and ethical considerations.

Unit II - Analytical Decision Making (07 Hours)

Analytical decision making process, characteristics of the analytical decision making process. Breaking down a business problem into key questions that can be answered through analytics, Characteristics of good questions, Skills of a good business analyst, The Basic Tools of Business Analytics - Data exploration and visualization (using tools like Excel, Tableau, or Power BI), Concept of statistical analysis and hypothesis testing (Hypothesis testing numerical / runs not expected) Data Visualization: Concept of Data Visualization, Popular Data Visualization tools, Exploratory Data Analysis(EDA), Data Cleaning, Data Inspection.

Unit III - Predictive and Prescriptive Analytics (08 Hours)

Trend Lines, Regression Analysis Linear & Multiple, Predictive modeling, Forecasting Techniques, Data Mining - Definition, Approaches in Data Mining, Data Exploration & Reduction, Data mining

and Business Intelligence, Data mining for Business, Classification, Association, Cause Effect Modeling, Overview of Linear Optimization, Non-Linear Programming Integer Optimization, Cutting Plane algorithm and other methods, Decision Analysis Risk and uncertainty methods - Text analytics Web analytics.

Unit IV - Business Analytics in Marketing and Finance (08 Hours)

Marketing Analytics, Customer segmentation, targeting, and positioning, Campaign management and ROI measurement, Data-driven marketing strategies. Financial Analytics: Risk management and credit scoring, financial forecasting and planning, Case studies: Financial performance improvement through analytics (Non Statistical - Conceptual Treatment only).

Learning Resources

Text Books:

1. Camm, Cochran, Fry, Ohlmann, Anderson, Sweeney, Williams - Essentials of Business Analytics, Cengage Learning.
2. James Evans, Business Analytics, Pearson.
3. Albright Winston, Business Analytics - Data Analysis - Data Analysis and Decision Making, Cengage Learning, Reprint.
4. Sahil Raj, Business Analytics, Cengage Learning.
5. Knaflic, C. N. (2015). Storytelling with data: A data visualization guide for business professionals. Wiley.
6. Siegel, E. (2013). Predictive analytics: The power to predict who will click, buy, lie, or die. Wiley.
7. Winston, W. L. (2014). Marketing analytics: Data-driven techniques with Microsoft Excel. Wiley.

Savitribai Phule Pune University		
[illegible] : Mobile Journalism		
Teaching Scheme	Credits	Examination Scheme
Theory : 02 Hours/Week	02	CE : 15 Marks End Semester: 35 Marks

Course Objectives: The course aims to the fundamentals of mobile journalism, emphasizing its importance in the modern media landscape. Students will learn about the evolution of journalism in the digital age and understand the role of mobile devices in news gathering, production, and dissemination.

Course Outcomes: Upon successful completion of this course, students will be able to:

- Use the contemporary mobile technology
- Produce mobile news stories.
- Make videos for vertical platforms.
- Understand the audience matrix and analytics.
- Learn about Mobile gear and apps in the field to tell compelling visual stories

Course Contents
Unit I: Mobile Journalism (07 Hours)

Definition, importance of mobile journalism in changing era, Need&Significance, Mobile Generation, the scope of mobile, mobile influence on Journalism, Future of Mobile Journalism

Unit II - MOJO and Applications (07 Hours)

Mobile Journalism Kit, Importance of Mobile journalism Apps, Usage of Photo, Video, audio editing apps, Global adoption and its influence, MOJO in India

Unit III - Basic steps in Mobile Reporting (08 Hours)

Mobile Journalism content, Mobile apps for reporting, Audio and video mobile applications, Advantages, types of Mobile Journalism, Impact of Mobile on Society.

Unit IV - Planning Scripting Shooting Editing Publishing (08 Hours)

Content Gathering for mobile journalism news gathering, verification, editing etc., Using technology and apps for content creation and editing. Platforms Of Media, Future of Mojo reporting, Mobile Regulation authorities, TRAI,[illegible], Ethics in Mobile Journalism, Citizen Journalism

Learning Resources
Text Books:

1. Dam, Dr.Rahul (2022). Mobile Journalism: Story Based Communication in the Future, [illegible]
2. Montgomery Robb, Mobile Journalism, Independently Published,US
3. [illegible] (2013). Video Production, Second Edition

4. Mediafied, Ing. (2020) Mobile Editing: First Edition: Mobile Editing Tips for Beginners, Please Defind Isbn (eBook)

Reference Books:

1. Mobile and Social Media Journalism A Practical Guide by Anthony Adornato

2. MOJO: The Mobile Journalism Handbook: How to Make Broadcast Videos with an iPhone Or iPad By Ivo Burum

3. Mobile storytelling: A journalist's guide to the smartphone galaxy by Wytse Vellinga and Björn Staschen (Kindle e-book, March 2018)

E-books Links:

1. https://www.smartfilmfest.com/the-ultimate-beginners-guide-to-smartphone-filmmaking/ 2. https://www [illegible] mobile-journalism