Department of Pharmaceutical Sciences,  
Saurashtra University, Rajkot  
Master of Pharmacy Management (MPM) syllabus scheme  
Semester 9 TO 11

### Semester-IX

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of the course</th>
<th>Credits (Hrs./credits)</th>
<th>Maximum Marks</th>
<th>Minimum Passing standards</th>
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<tr>
<td>1</td>
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<td>2</td>
<td>Accounting for Management</td>
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<td>Quantitative Techniques and Management Techniques</td>
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*Internal Examination to be evaluated by the Department*
### Semester-X

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Course Objectives:
- Cover the basic concepts of management.
- Identify the key competencies needed to be an effective manager.
- Provide the students with the capability to apply theoretical knowledge in simulated and real-life settings.
- Develop the students’ ability to work in teams.

Course Learning Outcomes:
At the end of the course, student should be able to:
- Demonstrate critical thinking with managerial problems and express their views.
- Understand the major internal features of a business system and the environment in which it operates.
- Identify and explain the importance of the management process and identify some of the key skills required for the contemporary management practice.

1. **Schools of management thought**: Forerunners of Scientific Management; The era of Scientific Management; The human Behaviour School; The social system school; Decision theory school; The mathematical and quantitative school; The system school.
2. **The contingency theory of Management**: Contemporary Management thinkers; Contemporary organizational theories.
3. **Organizations and the need for management**: Why study organisations and management. Efficiency and effectiveness, management, process organizational environments.
4. **Social responsibility and ethics**.
5. **Downsizing distribution of authority**: Decentralisation, centralisation and making organisations.
6. **Effective Communications process**: Barriers and breakdowns in communications, effective communications.
7. **Controlling**: The system and process of controlling. Control techniques, control of overall performance. Ensuring effective controlling.

**Recommended books**:
1. Fundamentals of Management by J. F. Stoner,
2. Fundamentals of Management by Stephen. P. Robbins,
3. Fundamentals of Management by Andrew. J. Dubrin,
4. Fundamentals of Management by Ricky. W. Griffin,
Semester-IX

ACCOUNTING FOR MANAGEMENT

Theory (3 Hours/Week; 3 Credits, 45 Hours)

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<th>Evaluation Scheme</th>
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<td>Tutorial</td>
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Course Objectives:
- The main purpose of accounting is to provide financial information.
- Help to students to learn about accounting to prepare them for a mix of accounting professional activities, including public accounting, governmental accounting and corporate accounting.
- This financial information fulfils different objectives, namely stewardship, accountability, planning and decision making and control.

Course Learning Outcomes:
After studying this course, you should be able to:
- Define book keeping and accounting.
- Explain the general purposes and functions of accounting.
- Explain the differences between management and financial accounting.
- Describe the main elements of financial accounting information – assets, liabilities, revenue and expenses.
- Identify the main financial statements and their purposes.

1. **Basic accounting:** Concepts and conventions underlying preparation of financial statements; Accounting equations; Accounting Processes and accounting policies; Revenues and costs matching and inventory valuation; Preparation of final accounts; Trading account, profit and loss account, balance sheet. Depreciation accounting; Intangible assets accounting. Understanding published annual reports including fund flow statement. Accounting for price-level changes and human resources. Social and environmental accounting.

2. **Basic cost concepts:** Cost drivers, how and why costs are classified. Systems of cost determination. Cost analysis for decision making; Marketing and production decisions like deletion or addition of products, optimal use of limited resources, pricing, make or buy, joint product costs etc.

3. **Cost analysis for control:** Standard costing; Variances- materials, labour, overheads, sales and profits, budgeting and control; Budget preparation including master budget and zero-base-budgeting. Contemporary issues in management accounting; Value chain analysis, activity based costing, quality costing, target and life cycle costing.
Recommended books:
3. Financial Statement Analysis by George Foster
5. Management Accounting by S N Maheshwari
6. Financial Accounting by Mukherjee and Hanif
7. Accounting: Text and Cases by Robert N. Anthony
8. Essentials of Cost Accounting by V K Saxena and C D Vasisht
10. Cost Accounting: Principles and Practice by B M Lall Nigam
11. Cost Accounting by P C Tulsian
12. Fundamentals of Accounting by N K Agrawal and R K Sharma
13. Fundamentals of Accounting by T P Ghosh
15. Financial Accounting A Managerial perspective by Dr. D.Mukhopadhyay
Course Objectives:
- To integrate the basic concepts of economics with the tools of mathematics and statistics in order to analyze and make optimal business decisions.

Course Learning Outcomes:
At the end of the course, student should be able to:
- Understand the roles of managers in firms.
- Understand the internal and external decisions to be made by managers.
- Analyze the demand and supply conditions and assess the position of a company.
- Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.
- Analyze real-world business problems with a systematic theoretical framework.
- Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.


7. **The theory of distribution:** Determination of factor prices, rent, wages, interest and profit.

**Recommended books:**
1. Advanced Economics Theory by Ahuja, H.L.
3. Managerial Economics by Dean. J.
4. Managerial Economics by Duncan, W.R. and Crook, J.N.
5. Modern Micro-Economics by Koutsoyiannis, A.
6. Managerial Economics by Paul, S., Gupta, G. and Mote, V.
7. Managerial Economics by Varshney, R.L. and Maheshwari, K.L.
8. Macro Economics by Shapiro, E.
Semester-IX
PHARMACEUTICAL BUSINESS ENVIRONMENT
Theory (3 Hours/Week; 3 Credits, 45 Hours)

<table>
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<tr>
<th>Teaching Scheme</th>
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Course Objectives:
- To provide knowledge of the environment in pharmaceutical industry, the economic operational and financial framework with particular application to the transaction of insurance business.

Course Learning Outcomes:
At the end of the course, student should be able to:
- Discuss the supply and demand theory and its impact on pharma industry.
- Explain the effects of government policy on the economic environment and pharma industry.
- Outline how an entity operates in a business environment.
- Describe how financial information is utilized in pharma business.
- Explain the legal framework that regulates the pharma industry.

1. **Concept, significance and nature of corporate environment:** Critical elements of various broad environment factors changing dimensions of corporate environment. Emergence of new business houses in India.
2. **Technique of environmental scanning:** Environmental scanning of some industries.
3. **Economic environment of business:** Concept, component (fiscal and monetary policy) and development (pre-globalisation).
4. **Political legal environment of business:** The critical elements of political environment constitution provisions affecting business in India; The preamble, directive principles of state policy and fundamental rights, the economic roles of the government, growth and control of corporate sector in India. Political dimensions of doing business in India, changing dimensions of legal environment in India.
5. **International and technological environment:** Multinational corporation, foreign collaboration and Indian business, non resident Indian and corporate sector, World Bank, IMF polices and India, trade barriers, foreign trade polices, the technological environment in India, policy for research and development, technology and economic development, appropriate technology and problems of technology transfer.
6. Socio cultural environment.
**Recommended books:**

1. Business and Government by Francis Cherunilam
2. Business Environment by K Chidambaram and V Alagappan
3. Business Policy and Environment by K Aswathappa
4. Business Environment by F. Cherunilam
5. Business Environment by Raj Aggarwal and Parag Diwan
6. International Business Environment and Management by V K Bhall and S Shiva Ramu
7. Government and Business by N K Sengupta
8. World Trade Organization by Anne Krueger
9. Indian Constitution by D D Basu
10. Constitution of India by P M Bakshi
11. Technology Acquisition and Application: Interpretation of the Indian Experience by A V Desai
12. Technology and Economic Development The Indian Case by Debasish Mallick
13. Multinational Corporations in India by Shiva Ramu
15. Business Policy and Strategic Management by W F Glueck and Jauch
16. India's Family Owned Business ICFAI Case Study Series
17. Globalisation (The Economist Publication)
18. Economic Reform and Development by Raj Kumar Sen
19. Economic Policy and State Intervention by T N Srinivasan
20. The World is Flat: A brief history of the 21st Century by Thomas L. Friedman
21. Indian Economy by Ruddar Dutt and K P M S Undaram
22. Principles and Practice of Public Enterprise Management by Laxmi Narayan
23. Indian Economy by Bimal Jalan
Course Objectives:
- To create basic understanding on fundamental principles, problem areas and techniques of Quantitative Methods for business and management.
- Students will be taught the basic concepts of modeling and analysis for supporting decision making.
- Concepts are introduced through examples of applications. Tools used include basic algebra, graphing and Excel.

**Course Learning Outcomes:**
At the end of the course students should be able to:
- Understand and apply basic mathematical and statistical methods operations and perform basic algebra used in the mathematics of finance.
- Understand issues in the collection and analysis of quantitative data for supporting management decision making.
- Appreciate the value and limitations of using quantitative models for supporting decisions.
- Use Excel tools to display and analyse data and models.

1. **Frequency distribution:** Graphical representations; Measures of central tendency (mean, median, mode, quartiles etc.); Measure of dispersion (range, variance, standard deviation). Probability- introduction ideas (probability rules, statistical independence, statistical dependence, joint probability, marginal probability).
   a) Notion of random variable- expectation.
   b) Discrete distribution- Binomial, Poison.
   c) Continuous distribution- normal, exponential, uniform, joint distribution.
2. **Sampling design:** sampling and non-sampling error, random sampling, systematic sampling, sampling with probability proportions of size, stratified sampling, cluster sampling and multistage sampling. Estimation- point estimation and interval estimation. Hypothesis testing- one sample test, two sample test, z test, x^2 test.
3. **Simple regression and correlation:** Estimation using regression line. Correlation analysis. Introduction to multiple and partial correlation. Time series- variations in time series, trend analysis, cyclical variation, seasonal variation, irregular variation. Index numbers- unweighted aggregates index, weighted aggregates index. Average of relative methods, quantity and value indices.

4. **PERT/CPM:** Phases of project management, work breakdown structure (WBS), network arrow diagram. Measure of activity, Forward and backward pass Compulation, representation in tabular form, slack, critical path, probability of meeting the scheduled dates. A critical path for CPM, float, negative float, negative slack, crashing the network.

5. **Basics of linear programming:** Formulation of LPP, graphical method, simplex method, duality; Transportation model, least time transportation assignment model. TPT models- waiting line models, game theory.

**Recommended books:**

1. Business Statistics by Weiers
2. A first Course in Business Statistics by Mcclave
3. Quantitative Methods for Business and Economics by Glyn Burton, George Carroll, Stuart Wal
5. Business Statistics by S. P Gupta
6. Statistics for Management by Kapoor and Levin
7. Statistics for Business & Economics by Anderson
8. Business Statistics by Bhardwaj, R.S.
9. Statistics for Management by Levin & Rubin

**Semester-IX**

INFORMATION TECHNOLOGY AND MIS
Course Objectives:
- The objective of this course is to introduce the students to the Management Information Systems and its application in organizations.
- The course would expose the students to the managerial issues relating to information systems and help them identify and evaluate various options in Management Information Systems.

Course Learning Outcomes:
- At the end of the course, it is expected that students are able to understand the usage of information systems in management.
- The students also would understand the activities that are undertaken in acquiring an information system in an organization.
- Further the student would be aware of various information system and the issues in successful implementation of these technology solutions in any organization.

1. Introduction to hardware and software.
2. Office automation, business data processing including file organisation, data base management, artificial intelligence, flow charts and data flow diagrams.
3. **End user computing using MS-Office package:** MS Word, MS Excel, MS Power point, word processing including mail merge, transfer, editing, spreadsheet design, graphics, macros.
4. Networking concepts internet, netware basics, tools and services on internet, browsing the net. Gopher Eile systems, netware menus, electronic mail, address, newsgroup, all USENET, TELLNET for remote login, fundamentals of website design.
5. **Data communication:** Client/server technology, interactive computer graphics, computer viruses, downloading file with FTP, intranet and its business applications using HTML.
6. Functional applications of MIS with particular reference to knowledge management in pharmaceutical.
7. Application of following software in Management:
   a) Sigma Stat  
   b) Excel  
   c) SPSS, SAS  
   d) ERP  
   e) SAP

**Recommended books:**
1. Management Information Systems by Kenneth C. Laudon
2. Information Systems for Modern Management by Robert G. Murdick

Semester-IX
HUMAN BEHAVIOUR IN ORGANISATION
Theory (2 Hours/Week; 2 Credits, 30 Hours)
Course Objectives:
- This course is concerned with developing knowledge and skill in intrapersonal, interpersonal, group, and organizational level processes in work settings.
- The course employs lectures, cases, and exercises to further the managerial effectiveness of class participants.
- The overarching goal of this course is to prepare students with a way of thinking that increases their ability to understand and implement decisions about people in an organizational context.

Course Learning Outcomes:
At the end of the course students should be able to understand and develop a basic understanding on:
- Job Satisfaction
- Finding the Right People
- Organizational Culture
- Leadership and Conflict Resolution
- Understanding the Employees Better
- Understand how to Develop Good Leaders
- Develop a Good Team
- Higher Productivity

1. **Foundations of organisational behaviour:** Understanding behaviour in organisations, OB model.
2. Introduction to Individual.
3. **Motivation:** Needs, contents and processes; Maslow's hierarchy of human needs, Herzberg's two factor theory of motivation, Vroom's expectancy theory.
4. Group processes:
5. **Importance of values:** Types of values, attitudes and consistency (cognitive dissonance theory).
6. Group dynamics and teams.
7. **Leadership:** Trait theories, behavioural theories, Ohio state studies, university of Michigan studies, the managerial grid, contingency theories; Hersey and Blanchard's situational theory and path goal theory.
8. Transactional analysis.
9. **Organisational culture:** What is organisational culture, what does culture do, creating and sustaining culture, how employees learn culture.
10. **Organisational change:** Forces of change, resistance to change, approaches to managing organisational change.

11. **Conflict management:** Transitions in conflict thought, functional Vs dysfunctional conflict, the conflict process.

**Recommended books:**

1. Organizational Behavior by Luthans, F.
2. Organizational Behavior - Human Behavior at Work by Newstrom, J.W. and Davis, K.
3. Understanding Organizational Behaviour by Pareek, U.
4. Organizational Behavior by Robbins, S.P., Judge, T. and Sanghi, S.
5. Organisational Behaviour and Change by Weiss, P.
Course Objectives:

- The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.
- To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act.

Course Learning Outcomes:

- The students get awareness of acquiring the patent and copyright for innovative works in pharma.
- They also get the knowledge of plagiarism in their innovations which can be questioned legally.
- Students are come to know on different patent law persistent in different country and also make aware themselves by different patent application procedure.

1. **IPR fundamentals**: IP vs conventional property. Importance/role of IPRs in business management. Introduction to 8 different IP mechanisms, their characteristics, properties and business.
2. **IPRs in strategic business planning**: Business implications and importance of various IP mechanisms, especially patents.
3. **Elements of national and international patent applications**: Forms and formats. Drafting of patent applications; Fee, time schedules and related aspects. International patenting and introduction to PCT. Understanding patent life cycle management.
5. **Patent mapping**: Introduction and practical utility in business development.
6. **International treties-I**: Introduction to TRIPS. Concept behind GATT/TRIPS. Emergence of WTO.
7. **International treties-II**: DOHA declaration and its significance for Indian pharma industry. Cancum agreement. WIPO and its role in IP promotion at global level.
8. **Development of human IPR resources for business management**: Essential requirements, job profiles. Introduction to MIPC (Germany) and FPLC (USA). Role of AUTM, LESI. Practical tips for enhancing IP related qualifications for management professionals.
9. **Ethics in IP**: Importance and need for training in ethics and values in the context of IPRs. Case studies.
10. **Case studies**:
    a) Using patents as tools in strategic business planning.
b) Drafting of technology offers and requests.
c) Generating an ICC (infringement clearance certificate) and Technology status report) GTSR (Globald)
d) Practical exercise on patent mapping.

**Recommended books:**

1. Law Relating to Intellectual Property by B.L.Wadhera
2. IPR Handbook for Pharma Students and Researchers by P.Bansal
4. Patent Agent Examination by Sheetal Chopra and Akash Taneja
6. Making Breakthrough Innovation Happen by Porus Munshi
7. Innovation X- Why a Company's Toughest Problems are its Greatest Advantage by Adam Richardson
8. Legal Drafting for the Layman by Nabhi Kumar Jain
9. How to Write and Publish a Scientific Paper by Rober A Day
10. Concise Law Dictionary-with Legal Maxims, Latin Terms and Words and Phrases by Justice Y.V.Chandrachud
11. Biomedical Research- From Ideation to Publication by G.Jagadeesh and others
Semester-IX

TOPICS RELEVANT TO DRUGS AND PHARMACEUTICAL INDUSTRY

Theory (1 Hour/Week; 1 Credit, 15 Hours)

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Course Objectives:
- The main objective is to make the students aware about different infrastructure requirement of pharmaceutical plant.
- Develop and implement different policy regarding safety, disaster, corrosion etc.
- To understand the basics of documentation and record keeping.

Course Learning Outcomes:
At the end of the course, it is expected that students are able to understand.
- Various regulatory requirements for starting a new pharmaceutical plant.
- Student can able to review, frame and implement policies on various issues like safety, disaster, corrosion, waste management, pollution etc.
- Having fair knowledge on various management information system, instruments and their process control and use of computer to maintain them.

1. **Drug and pharmaceutical plants:** Building layout, equipment layout, regulatory requirements for the same.
2. **Safety aspects:** Fire, explosion, toxicity, hazards of some selected organic/ inorganic chemicals and methods to handle them safely.
3. **Disaster planning:** Hazard appraisal and control, “on-sight” and “off-sight” disaster planning.
4. **Corrosion and its prevention:** Corrosion characteristics of selected organic/ inorganic chemicals and compatible materials of construction.
5. **Documentation and regulatory record keeping:** Record keeping as required by different statutory bodies.
6. **Management information systems (MIS):** Information management, need, users, systems.
7. **Pollution and pollution control:** Concept and type of pollution, ecology and ecological balance, pollution and health hazards, gaseous pollution and control, water pollution and control.
8. **Waste Management:** Waste minimization technology used in pharma plants.
9. **Instrumentation and process control:** Fundamentals of automatic control, process measurements -concept of accuracy, sensitivity and precision, measurement and control of temperature, pressure level, density, pH, dissolved oxygen and carbon dioxide.
**10. Use of computers in process control:** Basics and recent computer developments in automation

**Recommended books:**
1. Fire Safety Management by Satish Tandon
2. Pollution Prevention of Chemical Processes by Allen David T.
3. The Treatment and Handling of Wastes by Bradshaw, A.D.
4. Good Pharmaceutical Manufacturing Practice: Rationale and Compliance by Sharp John
5. Management Information Systems by Laudon Kenneth C.
6. Plant Design and Economics for Chemical Engineers by Peters, Max S.
Semester-IX
SEMINAR
Theory (1 Hours/Week; 1 Credit, 15 Hours)

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<tr>
<th>Teaching Scheme</th>
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1. Introduction, information retrieval systems.
2. Writing term papers and reports.
4. Reading research papers.
5. Skills in oral presentation.

Each student has to present a seminar before end of the semester.
Semester-X  
PROJECT MANAGEMENT  
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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Course Objectives:

- This course is deals with various aspects of project management including technical and financial analysis, analysis of risk, Social cost benefit analysis.
- To study the project management environmental appraisal of project.
- To study the sources of project finance in India.

Students Learning Outcome

Upon completion of the subject student shall be able to –

- Understand about technical analysis of project, material inputs utilities, capital market demand and supply.
- Understand the importance of market survey and its implementation for product market planning
- Understand risk types, estimation of risk sensitivity and overall risk analysis
- Understand different types of projects, environmental resources and its impact on assessment of project.
- To learn different Indian financial policies in accordance with SEBI guideline.

1. Overview: Phases of capital budgeting; Levels of decision making and objectives of capital market and demand analysis: Situational analysis and specification of objectives, collection of secondary information, conduct of market survey, characterization of the market, demand forecasting, market planning.


4. **Financial feasibility analysis:** Preparation of detailed project report, format of application form of all India financial institutions.

5. **Project management:** Forms of project organisation, project planning, project control, human aspects of project management, pre-requisites for successful project implementation.

6. **Social cost benefit analysis (SCBA):** Rationale for SCBA: UNIDO approach to SCBA, Little Mirrless approach to SCBA, SCBA by financial institutions, public sector investment decision making in India.

7. **Environment appraisal of projects:** Types and dimensions of a project, meaning and scope of environment, environmental resources and values, environmental impact assessment and environmental impact statement.

8. **Project financing in India:** Means of finance, issues and policies of financial institutions, SEBI guidelines for financing, plans, structures of financial institution in India, schemes of assistance, term loan procedures, project appraisal by financial institutions.

---

**Recommended books:**

1. Projects: Preparation Appraisal and Implementation by Prasanna Chandra
2. Project Management: Strategic Financial Planning, Evaluation and Control by Bhaunesh M Patel
3. Total Project Management The Indian Context by P K Joy
4. United Nations: Industrial Development Organization's guide to Practical Project Appraisal Social Benefit Cost Analysis in Development Countries
5. Practical Project Management by R G Ghattas
6. Project Management by Harvey Maylor
7. The Balanced Scorecard Measures that Drive Performance by Robert S. Kaplan and D P Norton
8. Why Should anyone be Led by YOU? by Goffee, Rob and Gareth Jones
9. Critical Success Strategies for New Leaders at All Levels: The First 90 Days by Watkins Michael
11. PM Network of Project Management Institute
12. PMI's Career Track
Semester-X
ENTREPRENEURIAL DEVELOPMENT
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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<th>Course Objectives:</th>
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<td>➢ This course is deals with various aspects of overall entrepreneur development and barriers.</td>
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<tr>
<td>➢ To study the differences of intrapreneuring and entrepreneurship</td>
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<td>➢ Learn the various phases of entrepreneurship.</td>
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Students Learning Outcome
Upon completion of the subject student shall be able to –
➢ Learn the function of entrepreneur in overall growth of national economy.
➢ Understand different types of entrepreneurs and their relation with community.
➢ Describes different factors which are affected to entrepreneurship.
➢ Get idea for innovation and enhance the economic growth of country.

1. Entrepreneurship: Need, scope and philosophy.
2. Creativity and entrepreneurship.
3. Entrepreneurial competencies and traits.
4. Factors affecting entrepreneurial development: Religious, social, cultural, political, ancestral and demographic.
5. Entrepreneurship: A function of innovation.
9. Intrapreneuring and Entrepreneurship
10. Barriers to entrepreneurship
11. Intrapreneurial grid.
12. Becoming an Intrapreneur
13. Phases in entrepreneurship
14. Major approaches to corporate entre-preneurship.
15. Entrepreneurship competencies: Meaning and evaluation.
17. Social determinants of entrepreneurial growth
18. Functions of entrepreneur
19. Classification of entrepreneurs.

**Recommended books:**

1. Dynamics of Entrepreneurial Development and Management by Vasant Desai
2. Entrepreneurship Development Small Business Enterprises by Poornima Charanthimath
3. Small Scale Industries and Entrepreneurship by Vasant Desai
4. The Theory of Economic Development by Joseph A. Schumpeter
5. Entrepreneurial Development by S S Khanka
6. Business Innovation by Praveen Gupta
7. Launching New Ventures by K. Allen
8. Business Start-Up Kit by Steven D. Strauss

**Journals/Magazines/Newspapers:**

9. The Journal of Entrepreneurship
11. California Management Review
12. Economic and Political Weekly
13. Business World
14. Business Today
15. The Economist
16. Franchisee
17. Business Line
18. Business Standard
19. The Economic Times
20. Financial Express
Course Objectives:

- This course deals with the scope and importance of marketing research.
- To develop a research design incorporating exploration description and conclusion regarding market research.
- To develop different stages of sampling plans regarding market research.
- To apply different techniques for data processing, and analysis with its application.

Students Learning Outcome

Upon completion of the subject, students shall be able to:

- Understand the importance of marketing research with influencing factors.
- To identify different problems interfering in market research.
- Understand the importance of sampling plan in field investigation.
- Do application of methods in different types of research in the field.

1. Introduction: Nature, scope and importance of marketing research, role of marketing research in decision making; Factors influencing marketing research decisions, marketing information systems, the marketing research process.
2. Problem identification.
5. Field investigation.
6. Data processing: Editing, coding, classification and tabulation.
7. Data analysis: Hypothesis testing.
8. Application: Product research, advertising research, market and sales analysis research.

Recommended books:

1. Marketing Research by Agrawal, S.
2. Marketing Research by Boyd, Westfall and Stasch
4. Marketing Research for Managers by Crouch, S.
5. Handbook of Marketing Research by Ferber, R.
6. Research for Marketing Decisions by Green, Tull and Albauni
7. Marketing Research - Measurement and Method by Tull and Hawkins
8. Marketing Research by Aaker
9. Marketing Research by Naresh Malhotra
10. Statistics in Marketing Research by Chuck Chrapani
11. Statistics for Marketing and Consumer Research by Mario Mazzocchi
12. Questionnaire Design by IAN Brace Marketing Research by Malhotra

Semester-X
INTERNATIONAL MARKETING
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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Course Objectives:
- This course deals with global marketing strategy.
- To study the role of global trade organizations such as WTO and GATT.
- To study the various strategies of selection, pricing distribution and promotion of product at global market.
- To study the procedure for export and related EXIM policy with proper documenting.

Students Learning Outcome
Upon completion of the subject student shall be able to –
- Understand different theories of international trade and differentiate domestic and international market.
- To find out the factors affecting international trade.
- After selection of product student can fix the pricing international market.
- Identify the product as per EPRG framework.
- To understand global advertising regulations.

1. **International marketing**: Basis of international trade, theories of international trade, Adam Smith, Ricardo. Difference between domestic and international marketing,
2. **EPRG framework**: Scanning of international environment: Social, political, legal, economic, cultural environment for overseas markets.
3. **Factors affecting international trade**: Methods of entry, WTO/GATT, regional agreements commodity agreements.
4. **Product**: Identifying new products, international product planning, product design strategy, product elimination, adoption and diffusion of new products, branding strategies.
5. **Pricing strategies**: Methods of pricing, pricing an international product, transfer pricing, exchange rates and its impact on pricing factors affecting international prices.
6. Dumping and anti-dumping regulations.
7. **Distribution strategies**: Direct and indirect channels, factors affecting international channels, international channel management.
8. **Promotion strategy in overseas markets**: Perspectives of international advertising, standardization v/s localization, global media decisions, global advertising regulations, industry self-regulation.
9. Export documentation and procedures.
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<tr>
<td>1.</td>
<td>International Marketing Management by Miracle and Albaum</td>
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<td>2.</td>
<td>Management of International Operations by John Fayerweather</td>
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<td>3.</td>
<td>Accessing Export Potential by Martin T. Sliiper</td>
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<td>4.</td>
<td>Manager in the International Economy by R. Vernon</td>
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<td>5.</td>
<td>International Marketing by Vern Terpstra</td>
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<td>6.</td>
<td>International Marketing by V. H. Kriplani</td>
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<td>7.</td>
<td>Export Marketing by B.S. Rathore</td>
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<td>8.</td>
<td>Export Procedures and Documents by S.C. Jain</td>
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<td>9.</td>
<td>Global Marketing by Keegan</td>
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**Foreign trade policy:** EXIM Policy.

**Semester-X**
SALES MANAGEMENT AND SALES PROMOTION
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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Course Objectives:
- This course is deals with various aspects of sales management.
- To study the relationship of sales with other marketing functions.
- To study the role of sales organization in sales promotion.

Students Learning Outcome
Upon completion of the subject student shall be able to –
- Understand the functions and qualities of sales executives and process of selling.
- Learn interrelationship of different departments for sales of product promotion
- To understand different sell forecasting methods and force management.
- To understand work for sell promotion and barriers for communication.

1. **Sales management**: Objectives of sales management, functions and qualities of sales executive.
2. Sales function and its relationship with other marketing function.
3. **Sales organization**: Relationship of sales department (distributors, government and public).
4. Salesmanship and process of selling.
5. **Sales forecasting methods**: Sales budget, sales techniques and quotas.
7. **Sales promotion**: Marketing communication, how it works, barriers to communications.
8. **Sales promotion objectives**: Introduction of sales promotion in pharma sector; Advertising, personal selling, public relations and sales promotion of pharma products with elaboration of sales promotion methods and techniques of target at customer / consumers; Coupons, cash rebates, premiums (gifts), free samples, contests and sweepstakes, point of purchase displays, product demonstrations, trade shows and exhibitions, advertising specialties, middlemen; Trade shows and exhibitions, point-of-purchase displays, free goods, advertising allowances, contents for sales people, training middlemen's sales forces, product demonstrations, advertising specialties, and sales force; Sales contests, sales training manuals, sales meeting, packets with promotional materials, demonstration model of product and ethical issues.

**Recommended books:**
1. Myers: Advertising Management by Aaker
2. Advertising by James and Morris
3. Sales Management, Decisions, Policies and Cases by Cundiff, Still and Govind
4. Sales Programme Management by Benson P. Shapdiro
5. Professional Sales Management by Rolper E. Anderson, Joseph F.Hair, Alex J. Bush
6. Sales Management: Concepts and Cases by Johnson, Kurtz and Scheving
7. Marketing Management by Philip Kotler
INDUSTRIAL AND SERVICE MARKETING
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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Course Objectives:
- This course deals with various aspects of industrial and service marketing.
- Learn how to finalize product price, its production and distribution for industrial products.
- To know the importance of different services and its marketing.

Students Learning Outcome
Upon completion of the subject student shall be able to –
- Understand the role of industrial marketing as compared to retail marketing.
- Decide the different component of industrial product sell.
- Able to face different challenges and design strategy for service marketing.

1. **Industrial marketing**: Concept and role of industrial marketing, comparison with consumer marketing, purchasing and industrial marketing.
2. Product decisions in case of industrial products
3. Pricing in case of industrial products,
4. Production and distribution decision with reference to industrial products.
5. **Services**: Service sector and economic growth, service concept characteristics and classification of service, challenges in service marketing.
6. **Marketing mix in services marketing**: Product, price, place, promotion, people, physical evidences and process decisions.
7. Strategic issues in service marketing; Service differentiation and positioning,
8. Managing service quality, productivity in services.
9. **Designing a service strategy**: Marketing of health services - Hospitals and Path labs.
10. **Designing a service strategy**: Consultancy organizations.

**Recommended books:**
1. Industrial Marketing by Alexander, Cross A Hill
2. Industrial Marketing by Raymond Corey
3. Industrial Marketing by Dodge
4. Services Marketing by S. M. Jha
5. Services Marketing by Ravi Shanker
6. Service Marketing by Lovelock

Semester-X

CONTEMPORARY ISSUES IN PHARMACEUTICAL MARKETING
Theory (2 Hours/Week; 2 Credits, 30 Hours)

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Course Objectives:
- This course is deals with current issues in Pharmaceutical marketing.
- Highlight the issues arising in a path of product cycle between manufacturers to consumer.
- To study the role of e-detailing and e-branding in Pharmaceutical marketing.

Students Learning Outcome

Upon completion of the subject student shall be able to –
- Draw a thin line between e-detailing and e-branding.
- Identify the issues created during marketing to consumer.
- Draw a flow diagram of retail marketing organization.
- Understand the good marketing practice.

1. Director to consumer.
2. E-detailing
3. Customer relationship management CLV.
4. E-branding
5. Organised retailing
6. Integrated communication.
7. Good marketing practices

Recommended books:
3. Marketing Management: Analysis, Planning, Implementation & Control by Kotler, P.
5. Basic Marketing by Perreault, W.D. and Jerome, E.M.

Semester-X
FUNDAMENTALS OF R&D MANAGEMENT-I
Theory (2 Hours/Week; 2 Credits, 30 Hours)

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**Course Objectives:**
- This course is deals with various aspects of R&D management.
- To learn the making of research policy.
- To learn the role of different funding agencies in R&D management.
- To get idea about intellectual properties and ethics in R&D.

**Students Learning Outcome**

Upon completion of the subject student shall be able to –
- Understand the nuances of research and development.
- Learn about different agencies for management of research.
- To know the role of IPR and decide the strategies for R&D.

1. **Pharmaceutical Industry—an introduction:** An introduction to the course and a brief discussion: about the Pharma Industry in the national and global context.
2. **R&D-Understanding the nuances of Research and Development:** The meaning of 'Research' and 'Development'-How Research differs from Development Role of research in national development and economic progress, financial aspects of national research-outlays/outcomes/challenges.
3. **Management of Research- Funding, Monitoring, Outcome:** Management of Research at national level: Major organizations e.g. DRDO,ICAR,ICMR, CSIR, Univerities and autonomous institutes-1: Management of Research at Global Level(USA and Europe);Major organizations(USA)/Europe-1:Organisation of Research at Regional and Global levels, procedures adopted-1; Linkages and modalities for collaboration and coordination-1.
4. **Research policy making:** Research prioritization at National and Global level.
5. **R&D Intellectual Property Rights:** Critical role of IPR's in research management: Meaning and definition of IPRs, types and the mechanism most appropriate for R&D. Usefulness of patents and researchers; Role of propr art search in affecting quality of research; Avoiding duplication, infringement, identification of potential linkages and hot areas of research.
6. **Practical strategies on making R&D benefit society:** Challenges/mechanisms- Case studies and success stories.
7. **Ethics and values in R&D:** Understanding the elements of ethics and values; Critical importance in R&D-plagiarism and legal remedies.
**Recommended books:**

1. Research and Development Management in the Chemical and Pharmaceutical Industry by Peter Bamfield
2. Third Generation R & D by Philip Roussel
3. Fourth Generation R & D by William and Miller
4. Towards Sixth Generation of R & D Management by Denis Nobelius
5. R&D Tactics by H.R. Kaufman
6. Strategic Management of Technology and Innovation by Burgelman and Maidique
7. Practical Process Research & Development by Neal G. Anderson
8. Research and Development Management by Alan Glasser
Course Objectives:
Aims of this subject are to show how real-world managers design, implement, and use planning and control systems to implement business strategies. These controls provide helping hand to the management to support their decisions on operational and strategic level.

- This subject provides students the opportunity to understand traditional and innovative methods of management controls.
- How strategic and operational planning is used to govern a company in line with the goals of the organization.
- How management can assure, measure and evaluate the performance of the company.
- What kind of management incentives and methods are used to motivate management to proper performance and decision making (execution of strategy), how goal congruence is provided.
- To strengthen and train the students technically and in modern management, marketing, selling and production skills and techniques.

Students Learning Outcome
After completion of the course the student should be able to:
- Describe models and methods relating to reporting, communication, decision making and accountability in the management control area.
- Able to apply models and methods of management control in different areas.
- Analyse the financial performance.
- Show how models and methods in management control can be used to implement organisational changes.
- Assess and critically reflect on different models and methods in management control.

1. **Nature and scope of management control systems:** Basic concepts, boundaries of management control. The management control environment Behaviour in organizations including goals, goal congruence; Informal factors influencing goal congruence; Informal and formal control system; Types of organizations. Functions of the controller.

2. **Management control structure:** Responsibility centers; Revenue centers; Expense centers; Administrative and support centers; Research and development centers; Marketing centers; Profit centers. Transfer pricing objectives, methods, pricing corporate services, administration of transfer prices. Measuring and controlling assets employed structure of the analysis. Measuring assets employed; Economic value added (EVA) vs.
return on investment (ROI); Additional considerations in evaluating managers; Evaluating the economic performance of the entity.

3. **Analyzing Financial Performance:** Variance Analysis. Performance measurement information used in control system performance measurement systems; Interactive control. Management compensation characteristics of incentive compensation plans; Stock options; Phantom shares; Performance shares; Performance criteria and agency theory.

4. **Variations in management control:** Revolution in management control; Emerging management system. Implication on management accounting; Position of management accounting controls for differentiated strategies corporate strategy; Business unit strategy. Modern control methods Just-in-time (JIT); Computer integrated manufacturing; Decision support systems. Total quality management: Core concepts of total quality management quality for profits; Costs of quality; Learning from quality gurus such as Edward Deming, Joseph M. Juran, Kaoru Ishikawa, Philip B. Crosby, William E. Conway, Pitfalls in operationalizing TQM, ISO-9000: Concepts, certifications, methods and certifications. Service organizations and M.C.S.: Service organizations in general, professional service organizations; Financial service organizations; Health care organizations; Nonprofit organizations. Multinational organizations and M.C.S.: Cultural differences; Transfer pricing and exchange rates. Management control of projects.

**Recommended books:**
1. Management Control Systems by Robert N Anthony and Vijay Govindarajan
2. Cost Accounting: Planning and Control by Usry and Hammer
3. Cost Accounting: Processing, Evaluating and Using Cost Data by Morse and Roth
5. Management Accounting and Behaviour Sciences by Edwin H. Caplan

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**Semester-XI**

STRATEGIC MANAGEMENT
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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Course Objectives:
The aim of this subject is to introduce to the main concepts and thought processes in strategic management. The course develops strategic awareness and strategy skills. The business world today is considerably different and more complex than it was in the previous years. Both the challenges and opportunities facing organizations of all sizes today are greater than ever. Organizations are required to continuously find better ways to compete in the rapidly changing global business environment. Survival and competition have become imperative for organizations in the current global scenario. In this context, the course develops the strategic thinking and decision making abilities of students, especially in relation to understanding the employability of various strategies in different situations.

Students Learning Outcome
After completion of the course the student should be able to:

- Analyze the main structural features of an industry and develop strategies that position the firm most favorably in relation to competition and influence industry structure to enhance industry attractiveness.
- Describe the practical and integrative model of strategic management process that defines basic activities in strategic management.
- Recognize the different stages of industry evolution and recommend strategies appropriate to each stage.
- Demonstrate the knowledge and abilities in formulating strategies and strategic plans.
- Analyse the competitive situation and strategic dilemma in dealing with dynamic global business environment in terms of rapidly changing market trends and technological advancement.
- Evaluate challenges faced by managers in implementing and evaluating strategies based on the nature of business, industry, and cultural differences.
- Demonstrate the ability to think critically in relation to a particular problem, situation or strategic decision through real-world scenarios.
- Appraise the resources and capabilities of the firm in terms of their ability to confer sustainable competitive advantage and formulate strategies that leverage a firm’s core competencies.
- Recognize strategic decisions that present ethical challenges and make appropriate recommendations for ethical decision-making.
1. **The conceptual framework of strategy:** Concept and significance in Pharmaceutical Sector, definition,
2. Strategic management process,
3. External and Internal environmental analysis.
4. **Grand strategies:**
   a) Intensive growth opportunities: Market penetration strategy, market development strategy, product development strategy, diversification strategy.
   b) Integrative growth strategy: Backward integration, forward integration, horizontal integration.
   c) Diversification growth strategy: Concentric diversification, horizontal diversification, conglomerate diversification.
5. **Concentration strategy:** Market development, product development, innovation, joint venture, retrenchment / turnaround, divestiture strategy, liquidation, combination strategy.
6. **Choice of strategy:** Factors affecting choice of strategy firms mission, environmental factors, firm's strengths and weaknesses, managerial attitudes towards risk, managerial power relationships.
7. **Implementation of strategies:** Leadership implementation, functional policy implementation, organizational implementation.
8. Evaluation of strategy.
9. **Strategic choice-considering strategic alternatives:** Stability, retrenchment, expansion, combination.

**Recommended books:**
2. Business Policy and Strategic Management Concepts and Application by Gupta, Gollakota and a. Srinivasan
3. Innovating Organization by Pettigrew & Fenton (eds.)
4. Strategic Management : Building and Sustaining Competitive Advantage by Pitts
5. Strategic Management by Dess and Miller
6. Business policy and Strategic Management by Azhar Kazmi
Semester-XI
INTERNATIONAL REGULATORY ENVIRONMENT
Theory (2 Hours/Week; 2 Credits, 30 Hours)

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Course Objectives:
Aim of this subject is to explore the regulatory provisions with respect to clinical trials, Investigational New Drug Application, New Drug Application, ANDA, market authorization of medicines, inspection of Pharmaceutical manufactures and product registration. To explore practical aspects repeated to patenting.

Students Learning Outcome
- To get familiar with regulatory aspects related to Research & Development as well as manufacturing and marketing of Pharmaceutical Products.
- To get familiar with ICH guidelines w.r.t. Quality topics.
- To get familiar with Regulatory provisions of Biotechnology Products.

1. Concept and historical development of registration of pharma companies and their process over the year:
   a) Safety
   b) Efficacy
   c) New drug approval.
2. Types of Registration application:
   a) NDA b) ANDA
   b) DMF d) Hybrid NDAs
3. Information consideration in regulatory filing:
   a) Preclinical data. b) Clinical data
   b) Chemistry manufacture and control of data
   c) Labeling information, environment related issue.
4. Comparative study of US and EU models with respect to NDA/ANDAs.
5. Attempt towards harmonisation of Global regulatory requirements ICH initiatives.

Recommended books:
2. The Pharmaceutical Regulatory Process, edited by Ira R. Berry, Marcel Dekker
4. FDA Guidelines
Effective Drug Regulation, A Multi Country Study, by Sauwakon Ratanawijit

5. www.ICH.Org

Semester-XI
BUSINESS COMMUNICATION
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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Course Objectives:
Aim of this subject is;
- To understand and demonstrate writing and speaking processes through invention, organization, drafting, revision, editing, and presentation.
- To understand the importance of specifying audience and purpose and to select appropriate communication choices.
- To participate effectively in groups with emphasis on listening, critical and reflective thinking, and responding.
- To develop the ability to research and write a documented paper and/or to give an oral presentation.

Students Learning Outcome
After completion of this Subject, the student should be able to:
- Apply business communication strategies and principles to prepare effective communication for domestic and international business situations.
- To understand and appropriately apply modes of expression, i.e., descriptive, expositive, narrative, scientific, and self-expressive, in written, visual, and oral communication.
- Identify ethical, legal, cultural, and global issues affecting business communication.
- Utilize analytical and problem solving skills appropriate to business communication.
- Participate in team activities that lead to the development of collaborative work skills.
- Select appropriate organizational formats and channels used in developing and presenting business messages.
- Compose and revise accurate business documents using computer technology.
- Communicate via electronic mail, Internet, and other technologies and Deliver an effective oral business presentation.
- To understand and apply basic principles of critical thinking, problem solving, and technical proficiency in the development of exposition and argument.
1. **Executive communication perspective:** Meaning, importance, elements of the communication model, barriers to communication.

2. **Ethics in business communication:** Ethics, audit, communication in a global marketplace. Business communication and legal issues, business communication and technology contract.

3. **The case method:** Introduction and brief history. Steps in case analysis, case presentation.

4. **Principles of business communication written:** The Gunning Fog Index. The reasoning process.

5. **Principles of business communications oral:** Making speeches, conducting meetings. Giving dictation.

6. **Types and techniques of business letters:** Basic qualities of business letter. Opening paragraph, closing paragraph.

7. **Mechanics of letter writing:** Specific types of letters, resume, inquiries solicited and unsolicited, answers to inquiry letters, favourable and unfavourable, order, order acknowledgement. Thank you letters, claims, answers to claims, bad news letters, sales letters.

8. **Report Writing.**

**Recommended books:**

1. Business Communication Today by Courtland, B. L. and Thill, J.V.


3. Business Communication by Murphy, H.A; Hilderlrand, W. and Thomas, P.J.,

4. Management Communication: A case Analysis Approach, Pearson Education by O'Rourke, J.S.

5. Handbook for Writers and Editors by Rao, S.S.

6. Basic Communication: Skills for Empowering the Internet Generation by Raymond, L. and Flately, M.
Course Objectives:
Aim of this subject is:
- To understand how a favourable brand and memorable brand experiences can influence a firm’s ability to withstand competitive pressures and thrive in dynamic market conditions.
- To understand the importance of branding in pharmaceutical industry.
- To understand how to build brand value.
- To develop knowledge of strategic brand management.

Students Learning Outcome
After completion of this Subject, the student should be able to:
- To understand the importance of branding and its potential within the pharmaceutical industry.
- To understand the valuation of pharmaceutical brand and Relevance of brand valuation to the pharmaceutical Industry, The value of a brand, Inter-brand's brand valuation methodology.
- To understand and apply strategic brand management for branding of pharmaceutical product and understand the role of advertising in branding pharmaceuticals.
- To understand the brand development process, Trade mark and regulatory issues.

1. Branding and its potential within the pharmaceutical industry: History, meaning, need, importance,
2. Branding in pharmaceutical industry.
3. Building brand values and brand strategy, timing, patient power,
4. Strategic brand management process.
5. The valuation of pharmaceutical brand: Relevance of brand valuation to the pharmaceutical Industry, The value of a brand, Inter-brand's brand valuation methodology,
6. Role of branding index, assessing brand strength.
7. The role of advertising in branding pharmaceuticals.
8. Brand development process
9. Trade mark and regulatory issues.

Recommended books:
1. Strategic Brand Management by Kevin Keller
2. Brand Positioning by Sen Gupta
3. Managing Indian Brands by Ramesh Kumar
4. Brand Failures by Matt Haig
Semester-XI
SUPPLY CHAIN MANAGEMENT IN PHARMACEUTICAL SECTOR
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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Course Objectives:
Aim of this subject is to understand;
- Concept of supply chain management, scope of SCM in pharmaceutical sector.
- The potential drivers and obstacles of supply chain.
- The management of supply chain in pharmaceutical industry.
- To effectively coordinate the supply chain and know financial factor in supply chain.

Students Learning Outcome
After completion of this Subject, the student should be able to:
- Understand fundamental supply chain management concepts in pharma sector.
- Apply knowledge to evaluate and manage an effective supply chain.
- To understand the pharmaceutical supply chain and effectively plan demand and supply in a supply chain.
- Understand the foundational role of logistics as it relates to transportation and warehousing.
- How to align the management of a supply chain with corporate goals and strategies.
- To Analyze and improve supply chain processes.

1. Concept of supply chain management, scope of SCM in pharma sector,
2. Drivers and obstacles of supply chain.
3. Planning demand and supply in a supply chain.
5. Transportation, network design in supply chain.
6. Role of information technology in supply chain.
9. Role of Logistics in supply chain.

Recommended books:
1. Supply Chain Management by Chopra
2. Marketing Logistics by Kapoor and Kansal
3. Logistics and Supply Chain Management by Cristopher
4. Strategic Supply Chain Management by Cohen and Rossel
5. Strategic Supply Chain Management by Micheal Hugos
Semester-XI
ADVERTISING IN PHARMACEUTICAL SECTOR
Theory (3 Hours/Week; 3 Credits, 45 Hours)

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Course Objectives:
Aim of this subject is to understand;
- Marketing communication and promotion management.
- The Nature and scope of advertising in pharmaceutical sector.
- The comprehensive description of the various regulatory and legal standards and their specific application to the advertising and promotion of drug and medical device products including detailed analysis of advertisements and promotion.

Students Learning Outcome
After completion of this Subject, the student should be able to:
- To understand marketing communication and promotion management.
- To understand the Nature and scope of advertising in pharmaceutical sector.
- To understand how to arrange the Campaign, planning for advertising the pharmaceutical product.
- To effectively apply the strategies of sales promotion and planning the sales promotion.
- To understand the Public relations and sponsorship marketing.
- To understand the comprehensive description of the various regulatory and legal standards and their specific application to the advertising and promotion of drug and medical device products including detailed analysis of advertisements and promotion.

1. **Introduction of marketing communication and promotion management:** Nature, scope, importance, role and promotion mix elements.
2. **Nature and scope of advertising:** Changing concepts of advertising, functions and types of advertising, economics and social effects of advertising.
3. **Campaign, planning:** Advertising campaign, campaign planning process:
   (a) Product market analysis
   (b) Setting advertising objectives DAGMAR approach
   (c) Advertising budgeting
   (d) Creative strategy and information processing
   (e) Media planning and scheduling.
4. **Copy design and development:** Copy, writing, script, story board, copy formats, layouts and illustration.
5. **Advertising control:** Measurement of advertising effectiveness, pre-measurement and post-measurement techniques of advertising research.
1. Advertising agency operations and management

6. **Sales promotion**: Factors affecting sales promotion, type of sales promotion, sales promotion planning.

7. **Direct marketing**: Direct response advertising, tele-marketing, advertising on internet.

8. Public relations and sponsorship marketing, even marketing

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**Recommended books:**

1. Advertising Management by Aaker, Myers
2. Advertising by Wright, Warner, Winter and Zeigler
3. Advertising by James and Morris
5. Strategic Planning Formulation of Corporate Strategy by Ramaswamy and Namakumari
6. Marketing Management by Philip Kotler
Course Objectives:
Aim of this subject is to understand;
- The strategic issues in R & D.
- The identification of relevance to national and societal needs practical strategies.
- The industrial problems as a source of project ideas, short-term and long-term perspectives.
- Know the 'development gaps' in research-reproducibility, scale-up, manufacturing challenges, regulatory aspects, ownership issue, material transfer aspects in case of biotech and pharmaceuticals.
- The Strategies for research commercialization- joint ventures, licensing, transfer of technology (tot) and strategic alliances (MOUs).

Students Learning Outcome
After completion of this Subject, the student should be able to:
- To identify the relevance to national and societal needs for R & d and develop practical strategies.
- To understand the industrial problems as a source of project ideas, short-term and long-term perspectives and find out the solution relevant to that problem.
- To Understand and know the 'development gaps' in research-reproducibility, scale-up, manufacturing challenges, regulatory aspects, ownership issue, material transfer aspects in case of biotech and pharmaceuticals.
- To understand the Strategies for research commercialization- joint ventures, licensing, transfer of technology (tot) and strategic alliances (MOUs).

1. **Strategic issues in R&D-an introduction:** Introduction to the course and a brief discussion about strategic issues in R&D-project identification and selection; Human resources, infrastructural resources and execution strategies
2. **Research project selection criteria:** Avoiding duplication and infringement appropriate search strategies and inputs for planning. Identification of relevance to national and societal needs practical strategies. Industrial problems as a source of project ideas, short-term and long-term perspectives.
3. **Infrastructural resource optimization:** Strategies to avoid duplication of facilities; Networking and strategic tie-ups/ creation and access of 'infrastructure databases'.
4. Exploitation of research-invention management and business strategy development for research commercialization: Understanding and addressing the 'development gaps' in research-reproducibility, scale-up, manufacturing challenges, regulatory aspects, ownership issue, material transfer aspects in case of biotech and pharmaceuticals. Strategies for research commercialization- joint ventures, licensing, transfer of technology (tot) and strategic alliances (MOUs).


**Recommended books:**

1. Research and Development Management in the Chemical and Pharmaceutical Industry by Peter Bamfield
2. Third Generation R & D by Philip Roussel
3. Fourth Generation R & D by William and Miller
4. Towards Sixth Generation of R & D Management by Denis Nobelius
5. R&D Tactics by H.R. Kaufman
6. Strategic Management of Technology and Innovation by Burgelman and Maidique
7. Practical Process Research & Development by Neal G. Anderson
8. Research and Development Management by Alan Glasse