

## MASTER OF MANAGEMENT STUDIES (PHARMACEUTICAL MANAGEMENT)

### COURSE STRUCTURE

Sl.No.	Paper Code	Second Semester Subjects	Credits*			Marks		
			( T+ P )			Intl. Asst.	End Term	Total
			T	P	Total			
<b>HARD CORE (compulsory)</b>								
1	PFM201	Pharmaceutical Financial Management	4	0	4	40	60	100
2	PSM202	Pharmaceutical Strategic Management	4	0	4	40	60	100
3	PHC203	Pharmaceutical Chemistry-II(Instrumental Analysis)	3	0	3	40	60	100
4	PHE204	Pharmaceutical Engineering	3	0	3	40	60	100
<b>SOFT CORE (select 2)</b>								
5	PAE205	Pharmaceutical Entrepreneurship	0	2	2	40	60	100
6	CAM206	Computer Application in Management using SAP	0	2	2	40	60	100
7	PAC207	Pharmaceutical Chemistry-III(Medicinal Chemistry-1)	0	2	2	40	60	100
<b>OPEN ELECTIVE(select 1)</b>								
8	PHB208	Pharmaceutical Biochemistry	4	0	4	40	60	100
9	MIS209	Managerial Information System	4	0	4	40	60	100

**Eligibility- Bachelor in any science stream**

CREDIT PER SEMESTER- 22 POINTS

TOTAL CREDIT- 88 POINTS

TOTAL MARKS- 2800 ( 700 PER SEMESTER)

#### HARD CORE

#### **1.1 BUSINESS ANALYTICS AND INTELLIGENCE**

##### **UNIT I**

Business Analytics (BA) - What does Analytics mean?; What to expect from Analytics?; When do we need Analytics? Where to and where not to use Analytics; Combining art and science; various software and tools used for BA

##### **UNIT II**

Components required to put BA to work – High-quality Data; Enterprise Orientation; Analytical Leadership; Strategic Targets; Good Analysts

Development and Deployment of Information at functional level - Establishing new Business Process; Optimizing existing business model; Which business process to start with?; Corporate Performance Management (CPM)

##### **UNIT III**

Embedding Analytics in Business Process; Building Analytical Culture; Reviewing business comprehensively to meet challenges along the way

Introduction to Data Warehouse (DW); Architecture and process in DW; Tips and techniques in DW; Software and tools used for building Data Warehouse

##### **UNIT IV**

Introduction to Business Intelligence (BI); Benefits of using BI; Various software used in BI; Centralized and decentralized organizations; Tasks and competencies; What is the right time to establish BI?

Introduction to Data mining; Data mining with target variables; explorative methods; business requirements; Software and tools used in Data Mining. Assessment and prioritization of BA Projects - How to identify a strategic projects?; Uncovering value creation; How to handle when project over runs?; What to do when the uncertainty is too big?; Future trends in BA

#### **REFERENCE BOOKS:**

1. Gert H.N. Laursen; Jesper Thorlund - Business Analytics for Managers: Taking Business Intelligence beyond reporting, John Wiley & Sons (2010)
2. Thosmas H. Davenport, Jeanne G. Harris, Robert Morrison - Analytics at work: Smart Decisions, Better Results 1<sup>st</sup> Edition, Harward Business School Press (2010)

## 1.2 HUMAN RESOURCE MANAGEMENT

### Unit I :

Human Resource Function Human Resource Philosophy - Changing environments of HRM - Strategic human resource management - Using HRM to attain competitive advantage - Trends in HRM Organisation of HR departments - Line and staff functions - Role of HR Managers.

### Unit II:

Recruitment & Placement Job analysis: Methods - IT and computerised skill inventory - Writing job specification – HR and the responsive organisation. Recruitment and selection process : Employment planning and forecasting - Building employee commitment : Promotion from within - Sources, Developing and Using application forms - IT and recruiting on the internet. Employee Testing & selection : Selection process, basic testing concepts, types of test, work samples & simulation, selection techniques, interview, common interviewing mistakes, Designing & conducting the effective interview, small business applications, computer aided interview.

### Unit III:

Training & Development Orientation & Training: Orienting the employees, the training process, need analysis, Training techniques, special purpose training, Training via the internet. Developing Manager: Management Development - The responsive managers - On-the-job and off-the-job Development techniques using HR to build a responsive organisation. Management Developments and CD- Roms - Key factor for success. Performance appraisal: Methods - Problem and solutions - MBO approach - The appraisal interviews - Performance appraisal in practice. Managing careers: Career planning and development - Managing promotions and transfers.

**Unit IV:** Compensation & Managing Quality Establishing Pay plans: Basics of compensation - factors determining pay rate - Current trends in compensation - Job evaluation - pricing managerial and professional jobs - Computerised job evaluation. Pay for performance and Financial incentives: Money and motivation - incentives for operations employees and executives - Organisation wide incentive plans - Practices in Indian organizations. Benefits and services: Statutory benefits - non-statutory (voluntary) benefits - Insurance benefits - retirement benefits and other welfare measures to build employee commitment.

Labour relations and employee security Industrial relation and collective bargaining : Trade unions - Collective bargaining - future of trade unionism. Discipline administration - grievances handling - managing dismissals and separation. Labour Welfare: Importance & Implications of labour legislations - Employee health - Auditing  
HR functions, Future of HRM function.

### REFERENCES:

1. Gary Dessler, "Human Resource Management", Seventh edition, Prentice-Hall of India P.Ltd., Pearson.
2. H.John Bernardin & Joyee E.A.Russel, Human Resource Management - An experiential approach, 4th Edition, McGraw-Hill International Edition., 2007
3. David A. DeCenzo & Stephen P.Robbins, Personnel/Human Resource Management, Third edition, PHI/Pearson.
4. VSP Roa, Human Resource Management : Text and cases, First edition, Excel Books, New Delhi - 2000.

## 1.3 PHARMACEUTICAL MARKETING MANAGEMENT

### Unit I

Marketing Concepts and Tasks, Defining and delivering customer value and satisfaction - Value chain - Delivery network, Marketing environment, Adapting marketing to new liberalised economy - Digitalisation, Customisation, Changing marketing practices, e-business - settingup websites; Marketing Information System, Strategic marketing planning and organization.

### Unit II

Buyer Behaviour, Market Segmentation and Targeting, Positioning and differentiation strategies, Product life cycle strategies, New product development, Product Mix and Product line decisions, Branding and Packaging, Price setting - objectives, factors and methods, Price adapting policies, Initiating and responding to price changes.

### Unit III

Marketing channel system - Functions and flows; Channel design, Channel management -Selection, Training, Motivation and evaluation of channel members; Channel dynamics - VMS, HMS, MMS; Market logistics decisions.

## **Unit IV**

Integrated marketing communication process and Mix; Advertising, Sales promotion and Publicrelation decisions. Direct marketing - Growth, Benefits and Channels; Telemarketing; Salesforce objectives, structure, size and compensation. Identifying and analysing competitors, Designing competitive strategies for leaders, challengers, followers and nichers: Customer Relationship marketing - Customer database, Data warehousing and mining. Attracting and retaining customers, Customerism in India, Controlling of marketing efforts. Global Target market selection, standardization Vs adoption, Product, Pricing, Distribution and Promotional Policy.

### **REFERENCES:**

1. Marketing Management - Philip Kotler - Pearson Education/PHI 12th Edition, 2006.
2. Marketing Management - Rajan Saxena - Tata McGraw Hill, 2002.
3. Marketing Management: Planning, Implementation and Control: Global Perspective Indian Context – VS Ramasamy & S. Namakumari - Macmilan India, 2007.
4. Marketing Management: A South Asian Perspective – Philip Kotler and Kevin Lane Kotler, Pearson Education, 11th Edition, 2007.
5. Basic Marketing - Perreault and McGarthy - Tata McGraw Hill, 2002.
6. Case and Simulations in Marketing - Ramphal and Gupta - Golgotia, Delhi.
7. Case Studies in Marketing - R.Srinivasan - PHI.
8. Marketing concepts and cases – Michael J Etzel, Bruce J Walker, William J Stanton and Ajay Pandit, TMH 13th Edition, New Delhi, 2007.
9. Marketing Management – S.Jayachandran - TMH, 2003.

## **1.4 BIO-STATISTICS**

### **Unit I Data Collection and Presentation**

- Types of data
- Types of variables
- Data collection tools (Observation method, Questionnaire method, Interview method)
- Construction of Questionnaires
- Graphical and Tabular representation of data
- Frequency Distribution (Simple and Grouped)
- Numerical Summarization of Medical Data
- Graphs in Health and Diseases

### **Unit II Measures of Central Tendency and Dispersion**

- Calculation of Mean, Median, Mode, Range, Quartiles, Variance
- Mean Deviation about mean and median
- Standard Deviation
- Coefficient of variation
- Quartile Deviation
- Basic concept of Skewness and Kurtosis

### **Unit III Vital Statistics & Time Series Analysis**

- Assessment of Morbidity
- Indicators of Mortality
- Fertility and Demographic Indicators
- Indicators of Social and Mental Health
- Components of Time Series
- Moving Average method
- Mathematical Curve Fitting (first degree, second degree, exponential)
- Business Forecasting

### **Unit IV Probability Theory and Distribution Functions**

- Concept of Sets and Venn diagram
- Basic concept of Probability
- Rules and sums, Conditional probability
- Mathematical Expectation
- Reference Range of Medical Parameters
- Confidence Interval
- Binomial, Poisson, Normal distributions

## REFERENCE BOOKS

1. K. Subramani, A.Santha – Statistics for Management, Second Edition, Scitech Publications, 2011.
2. T.N. Srivatsava, Shailaja Rego – Statistics for Management, The McGraw-Hill Companies, 2011

## SOFT CORE

### 1.5 PHARMACOLOGY

#### Unit-I

Pharmacology of Central Nervous System, neurohumoral transmission in the C.N.S., General Anesthetics, Alcohols and disulfiram, Sedatives, hypnotics, Anti-anxiety agents and Centrally acting muscle relaxants, Psychopharmacological agents and psychotics) anti-depressants and manics and hallucinogens), Anti-epileptics drugs, Anti-Parkinsonian Drugs, Analgesics, Antipyretics, Anti-inflammatory and Anti-gout drugs, Narcotic analgesics and antagonists, C.N.S. stimulants, Drug-Addiction and Drug Abuse

#### Unit-II

Pharmacology of Cardiovascular System, Digitalis and cardiac glycosides, Antihypertensive drugs, Antianginal and Vasodilator drugs, including calcium channel blockers and beta adrenergic antagonists, Antiarrhythmic drugs, Antihyperlipidemic drugs, Drugs Acting on the Hemopoetic System – Hematinics, Anticoagulants, Vitamin K and hemostatic agents, Fibrinolytic and anti-platelet drugs, Blood and plasma volume expanders.

#### Unit-III

Drugs that act on the blood and on blood forming tissues: Iron: Absorption and utilization of iron, iron deficiency, anaemia, therapeutic uses and side effect of iron, Hemostatics and coagulants, Anticoagulant drugs, Drugs Acting on the Respiratory System, Anti-asthmatic drugs including bronchodilators, Anti-tussives and expectorants, Respiratory stimulants, Pharmacology of Endocrine System:Hypothalamic and pituitary hormones, Thyroid hormones and anti-thyroid drugs, parathormone, calcitonin and Vitamin D, Insulin, oral hypoglycaemic agents & glucagon, ACTH and corticosteroids, Androgens and anabolic steroids, Estrogens, progesterone, Contraceptives and drugs used in infertility, Drugs acting on the uterus (Oxytocic)

#### Unit-IV

Chemotherapy:General Principles of Chemotherapy, Sulfonamides and cotrimoxazole, Antibiotics-Penicillins, Cephalosporins, Chloramphenicol, Erythromycin, Quinolones and Miscellaneous Antibiotics, Chemotherapy of tuberculosis, leprosy, fungal diseases, viral diseases, urinary tract infections and sexually transmitted diseases, Chemotherapy of malignancy and Immunosuppressive Agents, Drugs Acting on the Gastrointestinal Tract: Antacids, Anti Secretory and Anti-ulcer drugs, Laxatives and anti-diarrhoeal drugs, Appetite Stimulants and Suppressants, Emetics and anti-emetics, Miscellaneous-Carminatives, demulcents, protectives, adsorbents, astringents, digestants, enzymes and mucolytics.

Basic Concepts of Pharmacotherapy:Clinical Pharmacokinetics and individualization of Drug Therapy, Drug Delivery Systems and their Biopharmaceutic & Therapeutic Considerations, Drug used during Infancy and in the Elderly (Paediatrics & Geriatrics), Drug use during Pregnancy, Drug induced Diseases, *The Basics of Drug Interactions*, General Principles of Clinical Toxicology, Immunopharmacology :Introduction, immunomodulator, immunosuppressive agents and immunostimulant

#### REFERENCE :

1. D.R.Laurence and P.N.Bennett, "Clinical pharmacology".
2. R.S. Satoskar and S.D. Bhandarker, "Pharmacology and pharmacotherapeutics"
3. F.S.K. Barar Essentials of pharmacotherapeutics

### 1.6 Pharmaceutical Chemistry- I

#### UNIT I

Enzymes :Nomenclature, enzymes-kinetics and mechanism of action, mechanism of inhibition of enzymes and isoenzymes in chemical diagnosis. Co-enzymes:Vitamins as co-enzymes and their significance. Metals as co-enzymes and their significance.

#### UNIT II

Carbohydrate metabolism : Glycolysis, Gluconeogenesis and Glycogenolysis. Metabolism of galactose and galactosemia. Role of sugar nucleotides in biosynthesis and pentose phosphate pathway. The citric acid cycle, significance, reactions and energetics of the cycle. Lipid metabolism : Oxidation of fatty acid & energetics, Biosynthesis of ketone bodies and their utilization, Biosynthesis of saturated and unsaturated fatty acids., regulation of lipid metabolism, essential fatty acids.

### **UNIT III**

Biological Oxidation : The respiratory chain, its role in energy capture & control, Energetics of oxidative phosphorylation, mechanism of oxidative phosphorylation. Biosynthesis of amino acids, catabolism of amino acids and conversion of amino acids to specialized products, biosynthesis of purine and pyrimidine., formation of deoxyribonucleotides. 8. Biosynthesis of RNA, DNA replication, Carcinogenesis & DNA repair mechanism.

### **UNIT IV**

Genetic Code and Protein synthesis, components of protein synthesis, inhibition of protein synthesis. Regulation of gene expression. (Prokaryote and Eukaryote)

### **BOOKS RECOMMENDED:**

1. Indian Pharmacopoeia, Central Indian Pharmacopoeia Laboratory, Govt. of India, Ministry of Health & Family Welfare, Ghaziabad, Latest Edition.
2. U. S. Pharmacopoeia – NF, The United States Pharmacopoeial Convention, Rockville, USA, Latest Edition.
3. European Pharmacopoeia, Directorate for the Quality of Medicines of the Council of Europe (EDQM), Strasbourg, Europe, Latest Edition.
4. British Pharmacopoeia, The Stationary Office on behalf of the Medicine Health Care Product Regulatory Agency (MHRA), London, Latest Edition.
5. Mendham J, Denney RC, Barnes JD and Thomas M. Vogel's Textbook of Quantitative Chemical Analysis. Pearson Education Limited, Singapore. Latest Edition.
6. Silverstein RM and Webster FX. Spectrometric Identification of Organic Compounds. John Wiley and Sons, New York. Latest Edition.

## **1.7 CORPORATE COMMUNICATION**

### **Unit I:**

Communication basics – Business Communication – components – Types – formal communication network– Work team communication – variables – goal – conflict resolution – non – verbal communication – Cross cultural communication – Business meetings – Business Etiquette.

### **Unit II:**

Understanding Corporate Communication – Employee Communication – Managing Government Relations –Writing for Media and Media Relations

### **Unit III:**

Corporate Communication in Brand Promotion – Financial Communication – Crises Communication.

### **Unit IV:**

Report writing: Characterizing & business reports – Types and forms & reports – Project proposals –collection of data – tables constitution – charts – writing the report – documenting the sources – proof reading.

### **Unit V:**

Business Presentation: Written and oral presentation – work – team presentation – Delivering the business presentation visual aids – slides – electronic presentation – hand-outs – delivering the presentation – career planning – preparing Resume – job applications – preparation for a job interview – employment interviews – follow-up.

### **REFERENCES:**

1. Scot Ober, Contemporary business communication, fifth edition, biztantra.
2. Lesiler & Flat lay, Basic Business communication. Tata Mc Graw Hill

## OPEN ELECTIVE

### 1.8 Nanomedicines

#### UNIT I

Introduction to nonomedicines, class overview. Types of nanomaterials. Nanonephrology

#### UNIT II

Nanoneurology and molecular imaging

#### UNIT III

Drug Delivery. Nanomedicine and Cancer

#### UNIT IV

Toxicity and nano materials in medicine

#### REFERENCES:

- ☐☐ Jain, Kewal K. The Handbook of Nanomedicine. Humana Press, 2008. ISBN-13: 978-1- 6032-7318-3.
- ☐☐ Nanomedicine Design of Particles, Sensors, Motors, Implants, Robots, and Devices. Ed. Mark J. Schulz, Vesselin N. Shanov, and Yeohung Yun. Artech House, 2009. ISBN- 13: 978-1-5969-3279-1.
- ☐☐ Nanotechnology: Volume 5: Nanomedicine. Ed. Viola Vogel. Weinheim: Wiley-VCH Verlag GmbH & Co. KGaA, 2009. ISBN-13: 978-3-5273-1736-3.
- ☐☐ Nanotechnology in Biology and Medicine: Methods, devices, and applications. Ed. Tuan Vo-Dinh. Boca Raton, FL: CRC Press, Taylor & Francis Group, 2007. ISBN-13: 978-0- 8493-2949-4.
- ☐☐ Tibbals, Harry F. Perspectives in Nanotechnology: Medical Nanotechnology and Nanomedicine. Ed. Gabor L. Hornyak. Boca Raton, FL: CRC Press, Taylor & Francis Group, 2011. ISBN-13: 978-1-4398-0874-0.

### 1.9 DRUG DELIVERY SYSTEM

#### UNIT I

**Polymers-** Polymers for controlled release drug delivery like hydrogels, microparticles, nanoparticles, bioadhesive polymers, Transports of small molecules in polymers, Biodegradation of polymers, Compatability and biocompatibility of polymers, Applications of polymers, **Site Specific and Target Oriented Drug Delivery Systems-** Introduction, rationale, biological processes in drug targeting, Rationale for targeted drug delivery, Chemical targeting, Prodrugs approach, Targeted and site-specific drug delivery systems, e.g., tumor targeting, Drug-carrier delivery systems

#### UNIT II

**Buccal Drug Delivery Systems-** Introduction Anatomy & Physiology of Buccal mucosa, Drug delivery systems for buccal applications, **Nasal Drug Delivery Systems-** Introduction, physiological aspects, Mechanisms and pathways, Drug delivery systems

#### UNIT III

**Pulmonary Drug Delivery Systems-** Introduction, Anatomy of the lungs, Physiology of airways, Design considerations, Medical devices for the delivery of therapeutic aerosols to the lungs, Metered dose inhalers, Dry powder inhalers, Nebulizers, Therapeutic applications of aerosols, **Rectal and vaginal drug systems-** Historical aspects, Benefits and advantages, Limitations, Physiological aspects, Controlled drug delivery to return and vagina

#### UNIT IV

**Delivery of peptide based pharmaceuticals-** Introduction, Structural complexity and challenges to peptides and protein delivery of drugs, Peptide-based drug delivery systems, Ocular delivery of drug- Introduction, Physiology of the eye, Ocular controlled drug delivery systems. Colloidal drug delivery systems- Liposomes, Microspheres, Microparticles, Nanoparticles, Polymeric micelles, Transdermal drug delivery systems (TDDS) – Introduction, Anatomy of the skin, Biochemistry of the skin, Mechanisms and types of rate controlled transdermal drug delivery systems, Recent developments e.g. transferosomes, Evaluation of TDDS, e.g. in-vitro skin permeation, in -vivo transdermal bioavailability, Optimization of the drug delivery systems

#### BOOKS RECOMMENDED :

1. D.R.Laurence and P.N.Bennett, "Clinical pharmacology".
2. R.S. Satoskar and S.D. Bhandarker, "Pharmacology and pharmacotherapeutics"
3. F.S.K. Barar Essentials of pharmacotherapeutics

## **HARD CORE**

### **2.1 PHARMACEUTICAL FINANCIAL MANAGEMENT**

#### **UNIT I**

##### **Debt Market**

- Features of Bonds
- Price of a Bond, Yield to Maturity (YTM) and Current Yield
- Money Market and Debt Market Instruments
- Credit Rating

##### **Risk and Return**

- Statistical Characteristics of Portfolios
- Diversification
- Systematic and Non Systematic Risk

##### **Derivative Assets**

- Forward and Future
- Option – Call Option and Put Option
- Payoff Profile – Call Option Buyer and Seller, Put Option Buyer and Seller

#### **UNIT II**

##### **Cost of Capital: Concept**

- Computation of Specific Cost of Capital for Equity - Preference – Debt
- Weighted Average Cost of Capital – Marginal Cost of Capital
- Factors affecting Cost of Capital

##### **Operating & Financial Leverage**

- Operating Leverage
- Financial Leverage, Total Leverage
- Indifference-Analysis in leverage study

#### **UNIT III**

##### **Choice of Corporate Capital Structure**

- Basic Feature of Debt and Equity
- Net Income, Net Operating Income and Traditional Approach.
- Modigliani Miller Theorem.
- Modigliani Miller and Corporate Taxation with and without Bankruptcy Cost.
- Modigliani Miller with Corporate and Personal Taxation

#### **UNIT IV**

##### **Dividend Policy**

- Ex-dividend & Cum-dividend Share Price- Factors influencing dividend decisions
- Gordon Growth Model
- Walter Model
- Modigliani Miller and Dividend Policy
- Lintner Empirical Result on Dividend Policy
- Taxation and Clientele Theory
- Legal Considerations in paying dividend

##### **Mergers and Acquisitions**

- Concepts and Classifications
- Mergers and Acquisition in India – Examples
- Benefits of Mergers and Acquisitions

#### **REFERENCE BOOKS:**

1. I.M.Pandey - Financial Management, 2009
2. Khan & Jain - Financial Management, 2011
3. Prasanna Chandra - Financial Management, 2011

## 2.2 PHARMACEUTICAL STRATEGIC MARKETING

### UNIT I

Business Strategy - the strategic role of marketing strategies, corporate strategic decisions, business strategies and marketing implications. Positive points in proper strategic decision making. Negative points of negative strategy.

### UNIT II

Environmental Analysis, industrial analysis, competitive analysis, internal and customer analysis, differentiation and positioning strategies, obtaining strategic competitive advantage, marketing strategies for new market.

### UNIT III

Marketing of Services - meaning - nature of services -

Relationship marketing - Concept of a brand – Branding – Co-branding – creating a brand.

### UNIT IV

Marketing strategies for growth market, marketing strategies for mature and declining markets, marketing strategies for consumer goods firms, service firms and industrial firms – different types of marketing – direct marketing – network marketing – affiliate marketing. Global marketing strategies, implementing and controlling marketing strategies. Social Media Marketing – information, communication, technology in marketing – events as platforms for marketing

### REFERENCE BOOKS:

1. Philip Kotler - Marketing management, 2009
2. Ashok Ranchhod, - Marketing Strategies : A Contemporary Approach, Pearson 2011

## 2.3 PHARMACEUTICAL CHEMISTRY-II

### Unit I:

Applications of optical and electrical instruments used in pharmaceutical analysis.

### Unit II:

Applications of polarography in pharmaceutical analysis.

### Unit III:

Theory, methods and application of absorption partition, paper, gas chromatography, TLC, PLC, HPLC, paper electrophoresis and counter current extraction.

### Unit IV:

A comparative study of the advanced physicochemical and chemical methods in analysis of drugs and pharmaceutical preparations as exemplified by vitamins, antibiotics, glycosides, alkaloids, sulphonamides, analgesics, antihistamines. Chemical bonding and molecular structure. Valance electrons, ionic bonds, covalent bonds, bond parameters, Lewis structure, Polar character of covalent bond, VSEPR theory, concept of hybridization, molecular orbital theory

### REFERENCE:

1. Principles of Biochemistry – Smith et al., Mc Graw Hill International book Company 8th ed
2. Principles of Biochemistry – Lehninger, Nelson, Cox, CBS publishers.
3. Fundamentals of Biochemistry – Voet et al., Jhon Wiley and Sons Inc.
4. Biochemistry – Zubay, WCB Publishers.
5. Harpers Biochemistry, R.K. Murray, D.K.Granner, P.A Mayes and V.W. Rodwell, Practise Halt International
6. Biochemistry – Stryer.

## 2.4 PHARMACEUTICAL ENGINEERING

### UNIT I

#### Heat Transfer

- Heat transfer, overall heat transfer coefficient, sources of heat, steam and electricity as heating media, determination of requirement of amount of steam/ electrical energy, steam pressure, heat exchangers.

#### Drying

- Moisture content and mechanism of drying, theory of drying. Concept of EMC, CMC, FMC, drying rate curves, drying problems, Classification and types of dryers, dryers used in pharmaceutical industries and special drying methods. Definition, objectives of size reduction and size separation, factors affecting size reduction, laws governing energy and power requirements of mills including ball mill, hammer mill, fluid energy mill, sieve analysis, standards of sieves, size separation equipment shaking and vibrating screens, gyratory screens, cyclone separator, air separator, bag filters, Cottrell precipitator, scrubbers, size separators basing on sedimentation theory.

### UNIT II

#### Mixing and Homogenization

- Theory of mixing, mixing efficiency, solid-solid, solid-liquid and liquid-liquid mixing equipments, homogenizers.

#### Evaporation



- Basic concept of phase equilibria, factors affecting evaporation, evaporators, film evaporator, single effect and multiple effect evaporators.

#### **Distillation**

- Raoult's law, phase diagrams, volatility, simple, steam and flash distillations, principles of rectification of binary mixtures, Azeotropic and extractive distillation, Batch distillation, design method of plate column, steam, vacuum, molecular and azeotropic distillations, problems

#### **Filtration**

- Theory of filtration, filter aids, filter media, industrial filters including filter press, rotary filter, edge filter. Factors affecting filtration, optimum cleaning cycle on batch filters.

#### **UNIT III**

##### **Extraction**

- Solvent extraction (liquid-liquid) and leaching, parallel current and cross-treatment method, equipments like batch extractor, centrifugal extractor, continuous leacher etc. problems

##### **Fluid Flow**

- Type of flow, Reynold's number, Viscosity, concept of boundary layer, basic equations of fluid flow, valves, flow meters, manometers and measurement of flow and pressure. Humidification, Humidity Control and Refrigeration
- Basic concepts and definition, Dry and wet bulb thermometry, psychrometric chart and measurement of humidity, application of humidity, measurement in pharmacy, equipments of dehumidification operations principles of refrigeration, units of refrigeration, refrigerants, application in pharmacy. Principles of centrifugation, industrial centrifugal filters and centrifugal sedimenters.

#### **UNIT IV**

##### **Crystallization**

- Characteristics of crystals like – purity, size shape, geometry, habit, forms size and factors affecting them. Solubility curves and calculation of yields, material and heat balances around Swenson Walker Crystallizer. Supersaturation theory and its limitations, nucleation mechanisms, crystal growth, study of various types of crystallizer, tanks, agitated batch, Swenson Walker, single vacuum, circulating magma and Krystal crystallizer, caking of crystals and its prevention, numerical problems on yields. General study of composition, corrosion, resistance, properties and applications of materials of construction with special reference to stainless steel and glass.

##### **Industrial Hazards and safety Precautions**

Mechanical, Chemical, Electrical, fire and dust hazards, industrial dermatitis, accident records etc.

##### **BOOK REFERENCE:**

1.LiuJianping, Biopharmaceutics and pharmacokinetics, Fourth edition, People's Medical Publishing House, December 2011

#### **SOFT CORE**

### **2.5 PHARMACEUTICAL ENTREPRENEURSHIP**

#### **UNIT I**

**Introduction-** Who is an entrepreneur, Characteristics of a successful entrepreneur, Concept of Corporate Entrepreneurship, Entrepreneur Managers?, **Bootstrapping**

#### **UNIT II**

**Entrepreneurship and Innovation-** Effects of social, cultural and demographic changes, Windows and Corridor, Exploring the opportunities in new products and processes

#### **UNIT III**

**Generation of Business Ideas -** Identification of opportunity in the Medical fraternity, related case studies, **Feasibility Analysis and Preparing a Business Plan based on medical facilities -** Case Studies in Pharmacy, Diagnostic Centre, Medical Equipments, Medical Apparatus, Medical Counselling, etc.

#### **UNIT IV**

**Financial Resources for New Ventures-** Venture capital, Sources of debt financing for new and expanding ventures, Role of government and other agencies to provide financial help to small business, How to write application for financial assistance tax benefits to small scale business. Business Acquisition and Franchising - Evaluating Acquisition opportunities, Methods of valuation, Structuring the Acquisition, Franchising

#### **Books Recommended**

1. Cases in Entrepreneurship : the Venture creation Process - Eric. A. Morse & Ronald K. Mitchell. Sage South Asia edition..
2. Entrepreneurship - Rajeev Roy. Oxford Univ Process

## 2.6 COMPUTER APPLICATION USING SAP

### UNIT I

**WORD** – Creating a new document with templates & Wizard – Creating own document – Opening/modifying a saved document – converting files to and from other document formats – Using keyboard short-cuts & mouse – Adding symbols & pictures to documents – header and footers – Finding and replacing text – spell check and Grammar check – Formatting text - paragraph formats - adjusting margins, line space – character space – Changing font type, size – Bullets and numbering – Tables – Adding, editing, deleting tables – Working within tables – Adding, deleting, modifying rows and columns – merging & splitting cells.

**EXCEL** – Working with worksheets – cells – Entering, editing, moving, copying, cutting, pasting, transforming data – Inserting and deleting of cells, rows & columns – Working with multiple worksheets – switching between worksheets – moving, copying, inserting & deleting worksheets – Using formulas for quick Calculations – Working & entering a Formula – Formatting a worksheet – Creating and editing charts– elements of an Excel Chart – Selecting data to a chart – Types of chart – chart wizard – Formatting chart elements – Editing a chart – Printing charts.

**POWERPOINT** – Creating new presentations – Auto content wizard – Using template – Blank presentation – Opening existing presentations – Adding, editing, deleting, copying , hiding slides – Presentations – Applying new design – Adding graphics – Using headers and footers – Animations text – Special effects to create transition slides – Controlling the transition speed – Adding sounds to slides – Using action buttons.

### UNIT II

**TALLY** – Introduction and Installation, Required Hardware, Preparation for installation of Tally software, installation, Working in Tally: Opening new company, Safety of Accounts or Password, Characteristics, Making Ledger Accounts, Writing voucher, voucher entry, Making different types of vouchers, Correcting sundry debtors and sundry creditors accounts, Preparation of Trial Balance, Books of Accounts, Cash Book, Bank Books, Ledger Accounts, Group summary, Sales Register and Purchase Register, Journal Register, Statement of Accounts & Balance Sheet.

### UNIT III

**ERP & SAP:** Introduction – Need for ERP – Advantages – Major ERP Packages – SAP: Features – ABAP: Logon to SAP Environment – ABAP Dictionary – Functions – Objects – Managing SAP Application

### UNIT IV

**PRACTICALS:** Simple problems to be done in WORD, EXCEL and POWERPOINT using all the above mentioned topics.

### REFERENCES:

OFFICE 2000 Complete – BPB

Windows 98 Complete – BPB

Windows 98 6 in one by Jane Calabria and Dorothy Burke – PHI Using

Microsoft Office 2000 by Ed, Bott – PHI

Enterprise Resource planning (ERP): Text and case studies by Murthy, C S V, HPH

Teach yourself SAP in 24 hours by George Anderson; Danielle Larocca - Pearson Education

## 2.7 Pharmaceutical Chemistry-III

### UNIT I

Various Synthetic approaches to modern drugs. - retro synthetic analysis; - stereoselective and chemoselective synthesis; - pericyclic reactions.

### UNIT II

Mechanism of organic reactions: Carbonium, carbanion, carbene and nitrene.

### UNIT IV

Prostaglandin, Thromboxanes and Leukotrienes.

### UNIT IV

Interferons and Gene Therapy.

### BOOKS RECOMMENDED:

1. Wolff ME. Burger's Medicinal Chemistry and Drug Discovery, Principle and Practice. John Wiley and Sons, New York. Latest Edition.
2. Alnley W and James EF. Martindale, The Extra Pharmacopoeia. Pharmaceutical Press, London. Latest Edition.
3. Nogrady T. Medicinal Chemistry, A Biochemical Approach. Oxford University Press, New York. Latest Edition
4. Monographs and relevant review articles appearing in various periodicals and journals.
5. Franke R. Theoretical Drug Design Methods, Vol.VII. Elsevier, New York. Latest Edition.

## OPEN ELECTIVE

### 2.8 Pharmaceutical Biochemistry

#### UNIT - I

Bio chemical organization of the cell, molecular constituents of membrane, active & passive transport process, sodium and potassium pumps, osmoregulation and homeostasis.

#### UNIT – II

**Bio-energetics & Redox Reactions:** The concept of free energy, laws of thermodynamics. Determination of change in free energy from equilibrium constant & reduction potential. Production of ATP and its biological significance.

Redox reactions, redox potential, the respiratory chain & its role in energy capture & its control. Oxidative phosphorylation & its energetics & E.T.S mechanism of actions.

#### UNIT – III

**Enzymes & Co-Enzymes:** Classification, Structure, mechanism of action, properties, factors affecting enzymes action. Activators & de activators of enzymes, enzyme kinetics & enzyme inhibitions, repressions with reference to drug action.

Introduction to Bio-Molecules: Structure, classification, cell and biological functions of carbohydrates, proteins, lipids, nucleic acids (DNA & RNA) vitamins & minerals.

#### UNIT - IV

**Metabolism of Carbohydrates:** Glycolysis, glycogenolysis, gluconeogenesis, Krebs's cycle, HMP & uronic acid pathways, anaerobic respiration in muscle.

Metabolism of Proteins: *Amino acid structure & classifications, de amination, Trans-amination, de-carboxylation, Urea cycle, Metabolism & examples:*

Valine, cystine, cysteine, tryptophan, tyrosine, methionine.

Metabolism of Lipids:

*Oxidations :* Alpha, Beta, Gamma & Omega oxidations of fatty acids, bio-synthesis of fatty acids, cholesterol, ketogenesis.

Introduction to xenobiotic metabolism, detoxification, conjugation, prostaglandins & related products (Eicosanoids).

#### REFERENCES:

□□	Harper, Biochemistry
□□	A.L.Lehninger, Principles of Biochemistry.
□□	J.L.Jain, Fundamentals of Biochemistry
□□	Satyanarayana, Text Book of Biochemistry
□□	Rama Rao, Text Book of Bio Chemistry.
□□	Conn, Outlines of biochemistry

## OPEN ELECTIVE

### 2.9 MANAGEMENT INFORMATION SYSTEM

#### UNIT I –

**Introduction** -MIS as a Concept, Managerial Functions, Management Hierarchy MIS Features, Myths about MIS, Information Concepts: Data, Information & Knowledge Types of Information Systems. IS Vs. IT. Challenges & Opportunities

#### UNIT II –

**CBIS**-Components of a CBIS. Types of CBIS: OAS, TPS, MIS, DSS, EIS, ES, KMS, AI

**Functional Subsystems**-Functional Subsystems of MIS (Marketing, Human Resource, Finance & Production). Introduction to ERP, CRM, SCM, DBMS

#### UNIT – III

**System Analysis & Design**-Systems as Organizational Change. BPR & Process Management SDLC. Systems Approaches. Role of Tally in Financial Management

**Concept of DBMS**-Advantages of DBMS over Flat Based System. Components of DBMS, ERD, Normalization. SQL Commands using ORACLE. Data Security

#### UNIT IV

**Data Communication & Networking**-Uses of Computer Networks, Types of Networks, Network Topologies, Wireless Computing landscape, m-Commerce & Mobile Computing using Java  
**e-Commerce**-Concept. Advantages. Models. Management Opportunities-Challenges-Solutions

## **REFERENCES:**

OFFICE 2000 Complete – BPB  
Windows 98 Complete – BPB  
Windows 98 6 in one by Jane Calabria and Dorothy Burke – PHI Using  
Microsoft Office 2000 by Ed, Bott – PHI  
Enterprise Resource planning (ERP): Text and case studies by Murthy, C S V, HPH  
Teach yourself SAP in 24 hours by George Anderson; Danielle Larocca - Pearson Education

## **HARD CORE**

### **3.1: SUMMER INTERNSHIP WITH PROJECT**

### **3.2 OTC, RETAIL & CONSUMER BEHAVIOUR**

#### **UNIT I**

Retailing – An Overview- Understanding, Scope and Benefits of pharmaceutical retailing, Overview of Pharmaceutical retailing. Pharmaceutical retail. Restrictions in selling of different pharmaceutical drugs, etc.

#### **UNIT II**

Retail institutions- Historical development of the OTC market, Classification of Retailers, Major players within the OTC market, Understanding the Retail Customer - Population, demographic and geographic analysis, Rx-to-OTC switching: The changing role of the consumer Rx-to-OTC switching: The changing role of the consumer, Consumer buying behavior for OTC drugs  
Consumer buying behavior for OTC drugs

#### **UNIT III**

Retail Market Strategy- Strategic Planning Process, Pharmacies as retail outlets for switched drugs, Growth potential within the OTC market, Building Sustainable Competitive Advantage, Marketing Strategies.  
Consumer Behaviour, perception and theories.

#### **UNIT IV**

Merchandise assortment planning- Organizing the buying process by categories, Product mix and assortment planning process, Merchandising and store management- Branding strategies, Merchandise purchasing process, Store Management. Store layout, design and visual merchandise- Store interior, exterior and security Store interior, exterior and security, Visual Merchandising for OTC drug retailing, Future Drivers of OTC Pharmaceuticals- The impact of technology on the OTC market, OTC pharmaceuticals: growth or maturity : in India and global Market, Development in OTC Pharmaceutical Marketing

## **BOOKS REFERENCE BOOKS:**

1. Philip Kotler - Marketing management, 2009
2. Ashok Ranchhod, - Marketing Strategies : A Contemporary Approach, Pearson 2011

### **3.3 Industrial Pharmacy**

#### **UNIT I**

Principles of improved tablet production system design: Raw materials, Cost efficiency. Tablet Pilot Plant: Designs, Stability features. Large volume Parenterals: Analysis of costs; Operations efficiency management.

#### **UNIT II**

Production planning and scheduling. Materials handling, operation sequencing. Master Production Records: Format, Flow sheets.

#### **UNIT III**

Process validation strategies. Raw materials: Establishment of specifications, test procedures, sampling procedures, Assay validation during product development phase.

#### **UNIT IV**

Application of ISO criteria to the production of different types of pharmaceutical products. Product validation: Principles; Parameters; Product Fault Detection mechanisms. Special problems of pharmaceutical packaging.

## **BOOKS RECOMMENDED :**

1. Lachman “The theory and Practice of Industrial Pharmacy
2. Remingtons “Pharmaceutical Sciences”
3. Bentley’s Pharmaceutics.
4. Pilot plants model and scale-up methods, by Johnstone and Thring

## **SOFT CORE**

### **3.4 PHARMACEUTICAL ETHICS, JURISPRUDENCE & IPR**

#### **Unit I**

Laws relating to Hospital formation: Promotion-Forming society-The Companies Act-Law of Partnership-A Sample Constitution for the Hospital-The Tamil Nadu Clinics Act. Laws relating Purchases and funding: Law of contracts-Law of Insurance-Export Import Policy-FEMA-Exemption of Income Tax for Donations-Tax Obligations: Filing Returns and Deductions at Source. Laws pertaining to Health: Central Births and Deaths Registration Act, 1969- Recent amendments – Medical Termination of Pregnancy Act, 1971 – Infant Milk Substitutes, Feeding Bottles and Infant Food Act, 1992.

#### **Unit II**

Laws pertaining to Hospitals: Transplantation of Human Organs Act, 1994 – Pre-natal Diagnostic Techniques (Regulation and Prevention of Misuse) Act, 1994 – Medical Negligence – Medico Legal Case – Dying Declaration-MCI act on medical education. The Biomedical Waste (Management and Handling) Rules-Radiation Safety System. Laws pertaining to Manufacture and sale of Drugs: Drugs and Cosmetics Acts, 1940 – Pharmacy Act, 1948 – Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954 – Poison Act, 1919 – Legislation for Tobacco control.

#### **Unit III**

**Introduction** to intellectual property and intellectual property rights: what is intellectual property, ownership, implications, procedures and process of IP approvals.

Type of patents, copy rights, Trade marks, design rights, geographical indications – importance of IPR - world intellectual Property rights organization (WIPO)

What can and what cannot be patented? – Patenting life – legal protection of biotechnological Inventions. Controversy over patenting naturally occurring biological molecules (genes and proteins)

Global Patenting, USA, EU and Worldwide patents, ownership, implications, procedures and process of IP approvals. Patenting laws in India: Indian patent act, recent court rulings on patent issues, bio similars, bio betters in India.

#### **UNIT IV**

**Ethics:** Definition, Scope, Relevance, Teleological vs Deontological

#### **Ethics in Philosophy**

- Ethics in Eastern Philosophy - Bhagavat Gita, Swami Vivekananda, Gandhi, Buddhism, Sufism, Vedantic Ethics
- Ethics in Western Philosophy - Aristotle, Plato, Spinoza, Kant, Descarte

#### **Ethical Consciousness of Markets**

- Kautilian Ethics

#### **REFERENCE BOOKS:**

1. The Law of Health Care Administrations – Stuart Showalter
2. Dynamics of Industrial Relations – C.B.Memoria
3. Industrial laws – N.D.Kapoor

### **3.5 Pharmaceutical Chemistry- IV**

#### **UNIT I**

Antineoplastic Agents Molecular mechanism of cancer, oncogenes. DNA intercalating drugs: DNA intercalators, alkylating and strand breakers.

#### **UNIT II**

Cardiovascular Agents Antianginal, antiarrhythmics, antihypertensive, antihyperlipidemics.

#### **UNIT III**

Psychotherapeutic Agents Biochemical basis of mental disorder, antipsychotics, antidepressants and antianxiety drugs. Antidiabetics . Chemotherapy of Parasitic and Microbial Infections Introduction, biology, mechanism of action, target for drug development and drug resistance (wheresoever involved) related to: Tuberculosis, amoebiasis, filariasis infections, viral infection and HIV infection, malaria and leishmaniasis.

#### **UNIT IV**

Prostaglandins and Other Eicosanoids . Nomenclature, biosynthesis, design of eicosanoid drugs, biological activity, metabolism, structure activity relationship, eicosanoids approved for human clinical use.

#### **BOOKS RECOMMENDED :**

1. Wolff ME. Burger's Medicinal Chemistry and Drug Discovery, Principle and Practice. John Wiley and Sons, New York. Latest Edition.
2. Alnley W and James EF. Martindale, The Extra Pharmacopoeia. Pharmaceutical Press, London. Latest Edition.
3. Nogrady T. Medicinal Chemistry, A Biochemical Approach. Oxford University Press, New York. Latest Edition.
4. Monographs and relevant review articles appearing in various periodicals and journals.
5. Franke R. Theoretical Drug Design Methods, Vol.VII. Elsevier, New York. Latest Edition.

### 3.6 INTERNATIONAL BUSINESS & BRAND MANAGEMENT

#### UNIT I

##### International Business

- **Theoretical foundations**
- ✓ Country-specific advantages (CSAs)
- ✓ Firm-specific advantages (FSAs)
- ✓ Rivalry between global competitors
- **Cultural foundations**
- ✓ Cultures across countries
- ✓ Culture and 'how to do business'
- ✓ Culture and negotiations
- **Country attractiveness**
- ✓ Environmental research
- ✓ Researching competitors
- ✓ Entry-evaluation procedure
- ✓ Country data sources
- ✓ Forecasting country sales

#### UNIT II

- **Licensing, strategic alliances, FDI**
- ✓ Licensing
- ✓ Strategic alliances
- ✓ Manufacturing subsidiaries
- **Local marketing**
- ✓ Local culture and buyer behavior
- ✓ Industrial buyers
- ✓ Local marketing in mature markets
- ✓ Local marketing in new growth markets
- **Global segmentation and positioning**
- ✓ Global products
- ✓ Global pricing
- ✓ Global distribution
- ✓ Global advertising
- **Currencies and foreign exchange**

#### UNIT III

##### Brand Management

- Understanding the concept, implication and scope of brand management
- Understanding brand equity, how to measure it and building brand equity
- Customer orientation and value analysis
- Brand identity, brand association, brand personality, brand portfolio analysis, and brand resonance
- Brand audit, brand report card, and brand roadmap
- Understanding brand positioning and different positioning strategies
- Positioning statement, joint-space mapping

#### UNIT IV

- Brand extension
- Celebrity endorsement
- Brand repositioning
- Competition analysis
- Consumer sales promotion
- Managing and interpreting brand performance
- Managing brands over time
- Managing brands over geographic boundaries and market segments

#### REFERENCE BOOKS:

1. Philip Kotler - Marketing management, 2009
2. Ashok Ranchhod, - Marketing Strategies : A Contemporary Approach, Pearson 2011

### 3.7 PHARMACEUTICAL MECHANDISING/ADVERTISEMENT

#### UNIT I

Introduction. Overview of Advertising Management. Overview of Consumer Behaviour. Consumer Buying Behaviour Who? What? Why? Where? When? How? How to leverage 'Consumer Behaviour' to market Products & Services (Pharmaceutical Specific)

#### UNIT II

Consumer Buying Decision Process in Pharmaceutical & Healthcare Industry. Individual Determinants of Consumer Behaviour. Motivation, Personality, Consumer Perceptions, Consumer learning & attitude. External Influence in Consumer Behaviour: Culture, Group Dynamics, Family, Social Class. Advertising Management Definition, Scope, Objective

#### UNIT III

Advertising as a Communication Mix. Functions of Advertising Management in Pharmaceutical & Healthcare Industry. The Hierarchy of Effects, AIDA model, Laivdgc-Stenier model. Budgeting in Advertising: Theory & Methods

#### UNIT IV

Advertising Campaign. Types, Planning and Managing Advertising campaign (special focus on BTL activities for Pharmaceutical & Healthcare Industry). Analysis of Advertising Media & Media Strategies. Overview of Major Media, Media Selection, Multi-Media Strategies. Media Planning Process. Message Appeals. Copywriting for BTL, Endorsers, Subliminal Messages. Ethical Issues in Advertising. Advertising Laws & Ethics in India. ASCI code of Conduct, Consumer Protection Act

#### REFERENCE BOOKS:

1. Philip Kotler - Marketing management, 2009
2. Ashok Ranchhod, - Marketing Strategies : A Contemporary Approach, Pearson 2011

#### OPEN ELECTIVE

### 3.8 MANAGERIAL ECONOMICS

#### UNIT I

##### Introduction to Economics

Scarcity and Efficiency. The three problems of economic organization, Market, Command, and Mixed Economies, The Market Mechanism, How Markets solve the three Economic problems? Economic Role of the Government, Opportunity Cost, General Equilibrium & Partial Equilibrium Concepts

The basic principle in managerial economics: "marginal revenue" equals "marginal cost" **Supply and Demand**

#### UNIT II

##### Analysis

Basic demand analysis: Analysis of Demand- The Concept of Demand and The Demand function, The Demand Schedule and the Demand Curve, Factors influencing the Demand Curve, A Change in Quantity demanded or Change in Demand.

Elasticity of Demand- Price Elasticity of Demand, concept of point elasticity and arc elasticity and their importance in decision making, Perfectly Elastic and Perfectly inelastic Demand (concept and application), Total Revenue and Total Expenditure. Relationship between AR, MR and Price Elasticity of Demand.

#### UNIT III

Cross Price Elasticity of Demand, Income Elasticity of Demand, Promotional or Advertising Elasticity of Demand, The determinants of Elasticity of Demand Slope and Elasticity. Luxury, Necessary, Inferior goods, Giffen goods, Substitutes and Complimentary goods (concept with industry examples) Analysis of Supply- The Supply Schedule, The Supply Curve, Behind the Supply Curve, The Law of Supply, Shifts in Supply, Price Elasticity of Supply, Equilibrium of Supply and Demand, Effect of a shift in the Supply and Demand, Simultaneous Shifts of Supply and Demand.

#### UNIT IV

##### Monopoly:

Source of Market Imperfections-Costs and Market Imperfections, price makers, Short and Long run Equilibrium of the Monopolist, Absence of Supply Curve under Monopoly, Effect of a shift in Demand on Monopoly, Natural monopoly, Price Discrimination, Types of Price Discrimination, Monopsony, Bilateral Monopoly.

##### Oligopoly and Strategic Behavior:

Introduction, asymmetric information, Indeterminateness of Equilibrium Price and Output Under Oligopoly, Non-collusive Oligopoly, Cournot's Model of Duopoly,

#### BOOK REFERENCES:

1. Managerial Economics-2<sup>nd</sup> Edition ,Piyali Ghosh,Purba Roychowdhury,Tata McGraw Hill (2011)
2. Managerial Economics- Damodaran,Oxford Press
3. Economics-19<sup>th</sup> Edition,Paul.A.Samuelson,William D Nordhaus, Tata McGraw Hill (2010)

### 3.9 HOSPITAL & CLINICAL PHARMACY

#### UNIT I

##### **Introduction**

- The role of hospital pharmacy department and its relationship to other hospital departments and staff.

##### **Hospital drug policy**

- Drug Committee, formulary and guidelines, other hospital committees such as infection control committee and research & ethics committee.

##### **Hospital Pharmacy Management**

- Staff (Professional and non-professional)
- Materials (drugs, non-drugs consumables)
- Financial (drug budget, cost centers)
- Planning infrastructure requirements (building, furniture and fitting, specialized Equipment, maintenance and repairs)
- Work load statistics, Hospital formulary

#### UNIT II

##### **Drug Store Management and Inventory Control**

- Organization of drug store
- Types of materials stocked, storage conditions.
- Purchase and Inventory Central-principles
- Purchase procedures
- Purchase order
- Procurement and stocking

##### **Drug Distribution**

- Purchasing
- Warehousing (Storage conditions, expiry date control, recycling of drugs, stock-taking, drug recalls)
- Drug distribution methods (ward stock, individual patient dispensing, unit doses)
- Specific requirements for inpatients, casualty / emergency theatre, ICU/CCU,
- Drugs of dependence

#### UNIT III

##### **Manufacturing**

- Sterile and non sterile production, including total parenteral nutrition
- IV additive service
- Pre-Packing and labeling Quality control
- Policy making of manufacturable items
- Demand and costing
- Personnel requirements
- Manufacturing practice
- Master formula Card, production control
- Manufacturing records

##### **Drug Information Services**

- Sources of Information on drugs, disease, treatment schedules, procurement of information, Computerized services (e.g. MEDLINE), Retrieval of information, Medication error

##### **Records and Reports**

- Prescription filling
- Drug profile
- Patent medication profile
- Cases on drug interaction and adverse reactions, idiosyncratic cases etc.

#### UNIT IV

##### **Nuclear Pharmacy**

- Introduction to Radio pharmaceuticals, radio-active half-life
- Units of radio-activity Production of radio-pharmaceuticals
- Methods of isotopic tagging
- Preparation of radio-isotopes in laboratory using radiation dosimetry
- Radio-isotope generators
- Permissible radiation dose level
- Radiation hazards and their prevention; Specifications for radio-active laboratory



### **BOOKS RECOMMENDED:**

1. D.R.Laurence and P.N.Bennett, "Clinical pharmacology".
2. R.S. Satoskar and S.D. Bhandarker, "Pharmacology and pharmacotherapeutics"
3. F.S.K. Barar Essentials of pharmacotherapeutics

### **HARD CORE**

#### **4.1 Pharmaceutical Chemistry-IV**

##### **UNIT I**

Structure, Stereo-chemistry, Molecular modification and biological activity of natural drug molecules, belonging to the following classes: Alkaloids: Morphine, Emetine, Reserpine, Ergot.

##### **UNIT II**

Naturally occurring Anticancer agents. Carotenoids: Carotenes, Xanthophylls. Glycosides and Saponins.

##### **UNIT III**

Steroids: Male and Female sex hormones (Testosterone, Estradiol). Progesterone, Adrenocorticoids (Cortisone). Contraceptive agents.

##### **UNIT IV**

Antibiotics:  $\beta$ -lactam (Cephalosporins), Chemistry of Macrolides (Erythromycin). Chemistry and Biochemical functions of Vitamins A (Retinoids), B6 and B12, C and E. Hormones (Insulin, Thyroid, Oxytocin).

### **BOOKS RECOMMENDED :**

1. Cordell GA. Introduction to Alkaloids. John Wiley and Sons, New York. Latest Edition.
2. Fieser LF and Fieser M. Steroids. Reinhold Publishing Co., New York. Latest Edition.
3. Wickery ML and Wickery B. Secondary Plant Metabolism. Mcmillan Press Ltd. London. Latest Edition.
4. Torseel KBG. Natural Product Chemistry. John Wiley and Sons, New York. Latest Edition.
5. Harborne JB. Phytochemical Methods. Chapman and Hall, London. Latest Edition.

#### **4.2 PHARMAEUTICAL SALES & DISTRIBUTION**

##### **UNIT – I**

Introduction to sales and distribution management, Introduction Evaluation of sales management, Nature and importance of sales management, Roles and skills of modern sales managers. Sales objective, strategies. Emerging trends in sales management. Linking sales and Distribution management.

##### **UNIT – II**

Personal selling : Preparation and process, The psychology in selling, Types of purchase, Effective Communication sales related marketing policies-Planning sales cost and budgeting.

##### **UNIT – III**

Emergence and components of marketing channels Types, Functions, Relationship, Retailing and wholesaling-Structure, operation and strategies, Physical Distribution-Structure and strategies, Channel management –Planning designing channel systems-organizing patterns. Assessing marketing channel performance, Distribution.

##### **UNIT – IV**

Channel and Retail management-Channel management by wholesalers and Retailers – Retail forms- Franchise designing and management –Tele marketing, e-Marketing, E tailing, Retail management – Identifying and understanding consumers-Choosing a store location, pricing and financial management – Establishing and maintaining a retail image. Customer service. Physical Distribution management importance of physical distribution, Logistics system analysis and design, Organization and control, Role and importance of warehousing, warehouse Type, size, Number.

### **Reference Book: -**

1. Sales and distribution management –Kuusha K. havaldar, Vasand Mcavde.
2. Marketing Channels – Lowies W. Selvi & Ahle Elansary – Prentice Hall, india.
3. Retail Management – A strategic approach – Beny Berman & Joel Evans –Macmillan, New York.
4. Physical Distribution MGT Logistic Approach – Ksanna –himalya.
5. Strategic Marketing Channel MGT – Donald Bowersose & Bixly cooper – Mc Graw Hill

## 4.3 INDUSTRIAL RELATION

### UNIT I

Industrial Relations – an overview: Meaning & Objectives, Importance, Approaches to IR-Unitary, Pluralistic, Marxist – Development of IR System in India, Labour – management Relations: Trade Unionism – Industrial Conflicts.

### UNIT II

Trade Unions: Meaning, Justification, Theories of TU, Types of TU, Trade Union Movement in India, Problems of Trade Unions, Functions of Trade Unions, Measures to strengthen Trade Unions, Trade Union Act-Registration & Recognition-Issues arising there off- Inter-union rivalry-Role of State and Politics of Mobilization – Judicial Activism, Labour aristocracy and Segmentation of Labour Markets-Issues arising – Contract Labour and contract labour abolition act, Organized Unions vs Unorganized unions and labour – splintering of unions – Central Trade Unions – Unionism in Emergent sectors.

### UNIT III

Industrial Disputes – Definition, Causes of Industrial Disputes, Types of Industrial Disputes, Prevention of Industrial Disputes, Settlement of Industrial Disputes, Industrial Disputes Act: Conditions to Strike & Lockouts, Lay-off, retrenchment & Closure, Rights of Union Representatives and Protections thereof, Conciliation, Adjudication, Laws relating to standing orders – Misconduct and Disciplinary Procedures, Model Standing Orders, Grievance Handling – Meaning, Need and Procedure, Payment of Wages Act, Bonus – Rules and Regulations, Provident Fund Regulations, Factories Act, Hospitals and Institutions Bill, ESMA, Maternity Benefits Act, Recent Amendments in Various Acts, Judicial Interpretations.

### UNIT IV

Collective Bargaining – Definition, Importance, Prerequisites of Collective Bargaining – Union Bargaining Process – Types of Bargaining – Collective bargaining in India, Joint Consultative Machineries, Workers Participation In Management, Worker Ownership as Turnaround Management, ESOP, Profit Sharing, Quality of Work-life and Quality Circles, Worker Empowerment. Negotiations – Process, Strategies and Tactics, Theories, Models, Steps. Strategic Management of Industrial Relations – Alternative Strategies in Labour Management Relations – Labour Laws in the Context of Structural Changes – Labour laws in the context of structural change – Industrial relations in Turnaround Management – Globalization, Liberalization, Mergers, Acquisitions, New Manufacturing reforms and their implications for labour force, ILO, AFLCIO, International Co-ordination amongst unions as response to Internationalization and Global Markets.

### REFERENCE BOOKS

1. Jerome Joseph, Industrial Relations: Towards a theory of Negotiated Connectedness, Response Books.
2. C.S. Venkataratnam, Globalization and Labor-management Relations, Sage Publications, New Delhi.
3. Bruce.E.Kaufman, The Global Evolution of Industrial Relations: Events, Ideas and the IIRA, Academic foundations, New Delhi, 2006.
4. Nikolai Rocovsky and Emily Sims, Corporate Successes Through People: Making International Labor standards Work for you, Academic Foundation, New Delhi, 2006.
5. P.C. Tripathi, Personal Management and Industrial Relations, Sultan Chand & Sons, New Delhi, 1978 (Reprint – 2004).
6. E.H. Mcgrath, S.J. Industrial Disputes, Prentice Hall of India, New Delhi, 1985.
7. Dr.R.Venkatapathy and Assissi Menachery, Industrial Relations and Labour Legislations, Adithya Publishers, Coimbatore.
8. Gerard. I. Nierenberg, The Art of Negotiating, 1981.
9. Burawoy.M., Manufacturing Consent: Changes in the Labor Process under Monoploy Capitalism, Chicago University Press, Chicago.
10. Samir Amin, Unequal Development, Monthly Review Press, New York, 1976. Richard Hyman, Understanding European Trade Unionism: Between Market, Class and Society, Sage Publications, 2001.

## 4.4 PROJECT & SEMINAR/ INDUSTRIAL TRAINING & SEMINAR