UNIT- 1 Introduction to Pharmacognosy:
Classification of plant Kingdom, Plant cell , Definition, History, Scope and development of Pharmacognosy, Importance of Pharmacognosy with special reference to Herbal drug Industry, Sources of natural medicinal products, Classification of crude drugs with suitable examples including chemotaxonomy.

UNIT – 2 Marine Pharmacognosy:
Definition, present status, classification of important bioactive agents with special reference to Marine Origin, General methods of isolation and purification of Marine natural compounds, Study of important bioactive agents including chemistry and uses of Marine Origin.

UNIT- 3
Alternative systems of medicine / traditional system of medicine: Introduction, Definition and Classification of alternative systems of medicine.

Ayurvedic system of medicine:
Principles of Ayurvedic system of medicine & their merits and demerits, Introduction on different dosage forms in ayurvedic medicine, Methods of preparation of Ayurvedic medicines.

Homeopathy systems of medicine:
Principles of Homeopathy system of medicine & their merits and demerits, Introduction on different dosage forms in homeopathic medicine, Methods of preparation of Homeopathic medicines.

Naturopathy and yoga system of medicine:
UNIT-4  Cultivation of medicinal and aromatic plants:
Conservation of Medicinal Plants – ex-situ and in-situ Cultivation, Biodiversity loss, Methods of Cultivation, Factors involved in cultivation of medicinal and aromatic plants with special reference to drug improvement, i. Exogenous factors – Temperature, Irrigation, Quantity of light, Soil, Mineral supplements, Fertilizers, Pests, Pest Control methods etc, ii. Endogenous factors – growth regulators, Pattern of growth, development and Growth Kinetics, Methods of collection, harvesting, processing (drying, garbling and packing) and storage of crude drugs.

UNIT- 5 Systematic Pharmacognostic study of medicinal and aromatic plants:
Definition, Classification, Synonym, biological source, geographical sources, history, cultivation, collection, processing, macroscopy and microscopic characters, standards, chemical constituents with structures, chemical tests, therapeutic and other uses, commercial varieties, substituents, adulterants and storage.

UNIT- 6 Systematic Pharmacognostic study of medicinal and aromatic plants:
Definition, Classification, Synonym, biological source, geographical sources, history, cultivation, collection, processing, macroscopy and microscopic characters, standards, chemical constituents with structures, chemical tests, therapeutic and other uses, commercial varieties, substituents, adulterants and storage.
Fibres: Cotton, Enzymes: Papain, Lipids: Ricinus, Proteins: Gelatin, Alkaloids: Opium, Cinchona, Ergot, Rauwolfia

UNIT-7: Quality control of the crude drugs:
Adulteration of crude drugs and their detection by Organoleptic, Microscopic, Physical, Chemical and Biological methods of evaluation.
I/II M.PHARMACY (1st SEMESTER)
ADVANCED PHARMACOGNOSY (PRACTICALS)

1. Measurement of length and width of phloem fibres in powdered crude drugs.
2. Measurement of diameter of starch grains in powdered crude drugs.
4*. Identification of powdered crude drugs by using Lycopodium spore method.
5*. Determination of stomatal number and stomatal index of dicot leaf drugs.
6*. Determination of vein-islet number and vein-islet termination number of dicot leaf drugs.
7. Determination of palisade ratio of dicot leaf drugs.
8. Determination of ash value of different powdered crude drugs.
9*. Determination of acid insoluble ash value of powdered crude drugs.
10. Determination of sulphated ash for different powdered crude drugs.
11. Determination of extractive values of different powdered drugs with different solvents.
12. Determination of Refractive index of different fixed and volatile oils.
15. Determination of specific gravity of fixed oils and volatile oils.
16. Determination of moisture content of crude drugs.
17. Determination of ester value of fixed oils.
18*. Microscopy of the crude drugs, containing fruit, seed, flower bud, leaf, stem, root, bark and wood containing drugs.
19. Identification of powdered crude drug mixtures of 5 different combinations based on microscopical characters.
20. Identification of different classes of crude drugs by general and specific chemical tests of different categories.
22. Demonstration of simple experiments to study the effect of plant growth regulators.
RECOMMENDED BOOKS:

1. Pharmacognosy by G.E. Trease, W.C. Evans, ELBS.
3. Marine Pharmacognosy by Dean F. Martin & George Padilla.
5. Ayurvedic Formulary of India, Government of India.
6. Alternate medicine – Dr. K.B.Nangia
7. Pharmacognosy and Pharmacobiotechnology – Ashutoshkar.
MPH 701 (T)

I/II M.PHARMACY (1st SEMESTER)
ADVANCED PHARMACOGNOSY
MODEL QUESTION PAPER

TIME: 3HOURS                                                                MAX MARKS: 70
ALL QUESTIONS CARRY EQUAL MARKS
ANSWER ANY FIVE QUESTIONS

1. a) Write scope and development of pharmacognosy and explain importance of chemotaxonamy.
    b) Write about the recent advances in pharmacognosy with respect to herbal drug industry.

2. a) List out the drugs in the marine region and state their importance.
    b) Explain in detailed about procedure for isolation and purification of marine products.
    c) Importance of bioactive agents.

3. a) Write about method of preparation of ayurvedic medicines.
    b) Mention the different dosage forms present in the homeopathic medicines.
    c) Write about principles of naturopathy and mention about its merits and demerits.

4. a) Give a detailed note on the factors influencing the cultivation of medicinal plants.
    b) Write short notes on collection, harvesting of crude drugs.

5. a) Give biological sources, chemical constituents and uses of any two drugs of resins.
    b) Write systemic pharmacognostic study of digitalis.
    c) Write different methods used in the extraction of volatile oils.

6. a) What are surgical dressings, and explain pharmacognostic study of cotton.
    b) Write about sources and chemical tests for opium and ergot alkaloids.

7. What are the different types of adulteration of crude drugs and explain about evaluation of adulterants by the chemical and biological methods.
MPH 702 (P)

I/II M.PHARMACY (1ST SEMESTER)
MODEL QUESTION PAPER (PRACTICALS)

Time: 6 hrs                                                                            Max Marks: 70

1. Synopsis : 15 Marks
2. Major Experiment : 25 Marks
3. Minor Experiment : 15 Marks
4. Viva-voce : 15 Marks

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks
for regularity, promptness, viva-voce and record maintenance).
UNIT – 1  Introduction to Genetics and Molecular Biology:
Structural, molecular and chromosomal organization of cell, cytogenetics, cell cycle, mitosis and miosis, genetic code and gene mutation, genetic engineering, genetic mapping and molecular maps of plant genomes.

UNIT – 2 Plant genetics:
Reproduction in plants, Variation in plants, Heritability, Gene recombination and Basis of plant breeding.

UNIT – 3 Gene transfer in plants:
Using vectors of Agrobacterium, Ti, Ri, Co-intergrative and intermediate plasmid, DNA mediated gene transfer techniques electroporation, microprojection, micro & macroinjection, liposomes, ultrasonication and localization of transferred gene in genetically modified plants, Plant chromosome analysis, Use of markers, DNA hybridisation.

UNIT – 4 Crop quality improving methods:
Chemodemes, Hybridization, Mutation & Polyploidy,

Applications of transgenic plants:
Resistance to physiological stress, insects, fungus, virus and herbicides, Production of Phytopharmaceuticals and edible vaccines.

UNIT – 5 Tissue culture:
Introduction, History and development of plant tissue culture, Laboratory requirements and general techniques, Tissue culture media, nutrients and mineral supplements.

Types of Plant tissue cultures:
Callus culture, Protoplasts culture, Cell suspension culture, Organ culture.

UNIT – 6 Applications of Plant Tissue culture:
Strategies for Production of secondary metabolites: Biotransformation - Use of precursors, Growth regulators and elicitors. Immobilization methods, Production of important secondary metabolites: Ex: Ajmalicine, Shikonin, Artemisin, Cinnamic acids, Flavonoids and Anthraquinones etc.,
UNIT-7 Enzymes
Types and Properties of enzymes.
Isolation and Purification of enzymes.
Immobilization of enzymes and its applications Enzyme reactors
Detailed study of Plant enzymes-Papain and Bromelain

Germplasm Conservation
In-situ conservation.
In-vitro methods of conservation.

RECOMMENDED BOOKS:
1. Advanced methods in plant breeding & biotechnology by David R Mirray
3. Pharmaceuticals Biotechnology S.P. Vyas & V.K. Dixit
6. Industrial Microbiology by L.E.Cassida.
8. Industrial Micobiology by Patel.
MPH 703 (T)

I/II M.PHARMACY (1st SEMESTER)
MEDICINAL PLANT PHARMA BIOTECHNOLOGY
MODEL QUESITON PAPER

TIME: 3HOURS
MAX MARKS: 70

ANSWER ANY FIVE QUESTIONS

1. a) Explain the structure and chromosomal organization of cell and discuss the importance of mitosis and meiosis.
   b) What are the gene mutations and explain various methods of molecular mapping.

2. a) Discuss various means of asexual reproduction in plants.
   b) Explain various methods of gene recombination and the importance of plant breeding.

3. Explain various techniques of gene transfer in plants.

4. a) Write the importance of hybridization and polyploidy in improving the quality of economically important plants.
   b) Explain in the detail applications of transgenesis in producing phytochemicals, edible vaccines and stress resistance plants.

5. Explain the medium requirements and the technique involved in plant tissue culture and write a note on cell suppression culture and organ culture.

6. a) Write about different precursors used for the production of secondary metabolites by using plant tissue culture.
   b) Explain the method of immobilization of plant cell
   c) Explain the biotransformation cycle with respect to
   i. Cinnamic acid
   ii. Flavonoids

7. a) Explain the method of isolation and purification of papain.
   b) Explain in-situ method of conserving germplasm.
UNIT- 1 Extraction: Introduction, definition, factors influencing the choice of extraction, principles of extraction methods, types of extraction (Extraction of Plant drugs by Microwave assisted techniques (wherever applicable) and their merits and demerits, Selection and Purification of Solvents for Extraction, Methods of isolation (including industrial methods) purification and characterization of following natural products:

   Starch, Citric acid, Pectin, Digoxin, Sennosides, Lawsons, Phyllanthin, Bacosides, Lycopene, Hesperidin, Diosgenin, Curcumin, Lemon grass oil, Sandal wood oil, Quinine, Morphine, Atropine, Vincristine, Emetine and Caffeine.

UNIT-2: Carbohydrates: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of Glucose & Sucrose.

   Glycosides: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of cardiac glycosides - digoxin, Anthracene glycosides - Sennosides.

   Vitamins: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of Ascorbic acid.

UNIT-3: Steroids: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of cholesterol.

   Plant Hormones: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of Auxins.
UNIT- 4: **Terpenoids**: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of Citral, Menthol and Zingiberene. Isoprene and Special Isoprene rule.

**Anti-biotics**: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of Penicillin’s.

UNIT- 5: **Natural Pigments**: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of Carotene, Lycopene, Bixin, Chlorophyll, Quercetine and Indigotine.

UNIT- 6: **Amino acids**: Introduction, Definition, Classification, Nomenclature, Source, importance, Preparation and Properties of amino acids.

**Peptides**: Introduction, Definition, Classification, Synthesis, determination of structure of Peptides.

**Proteins**: Introduction, Definition, Classification, properties, structure of Protein, Chemistry of Oxytocin, Thyroxin, Insulin.

UNIT- 7: **Alkaloids**: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of quinine, morphine and atropine.

**Purines**: Introduction, Definition, Classification, Nomenclature, Source, importance, Structure, chemistry, structural elucidation of Caffeine.
I/II M.PHARMACY (2nd SEMESTER)
ADVANCED PHYTOCHEMISTRY (PRACTICALS)

1. Isolation and characterization of starch from Potato.
2. Isolation and characterization of pectin from Orange peel.
3. Isolation and characterization of Citric acid from Lemon.
4. Isolation and characterization of sennosides from Senna.
5. Isolation and characterization of Laswone from Henna.
6. Isolation and characterization of Digoxin from digitalis leaves.
7. Isolation and characterization of hesparidine from Dried Orange peels.
8. Isolation and characterization of Diosgenin from Dioscorea.
9. Isolation and characterization of Beta carotene from Daccus.
10. Isolation and characterization of Lycopene from tomato.
11. Isolation and characterization of naringin from Grapes.
12. Isolation and characterization of Eugenol from Clove.
13. Isolation and characterization of Curcumine from Turmeric.
15. Isolation and characterization of Atropine from Atropa.
16. Isolation and characterization of Quinine from Cinchona.
17. Isolation and characterization of Reserpine from Rauwolfia.
18. Isolation and characterization of Caffeine from Tea leaves.
19. Phytochemical screening of Natural products.
RECOMMENDED BOOKS:

1. Natural products chemistry – Nakanishi Golo
2. Natural products – A Laboratory guide by Raphel Ikhan
3. Organic Chemistry by I.L. Finar vol.ii
4. Chemistry of Natural Products by K.W. Bentley
5. Pharmacognosy by Trease and Evans, ELBS.
8. Phytochemical methods of chemical analysis by Harbone.
11. The review of Natural products – Ara Dermarderosia.
I/II M.PHARMACY (2nd SEMESTER)

ADVANCED PHYTOCHEMISTRY

MODEL QUESTION PAPER

TIME: 3HOURS                                                               MAX MARKS: 70

ALL QUESTIONS CARRY EQUAL MARKS

ANSWER ANY FIVE QUESTIONS

01. Discuss the different factors influencing extraction. Give the isolation, purification and characterisation of citric acid, curcumin & vincristin.

02. What are glycosides? Classify them. Write the nomenclature, source, importance, structure, chemistry and structural elucidation of digoxin.

03. a) Discuss about the source, importance, structure and chemistry of cholesterol.
       b) Write in detail about plant hormones.

04. a) Enumerate the importance, structure, chemistry and structural elucidation of penicillin.
       b) Write a note on isoprene and special isoprene rule.

05. Classify natural pigments and write in detail about the structural elucidation of carotene and lycopane.

06. a) What are Peptides? Write about the synthesis and determination of structure of peptides?
       b) Classify proteins and discuss the chemistry of oxytocin.

07. What are alkaloids? Write the nomenclature, source, importance, structure, chemistry and structural elucidation of quinine and morphine.

MPH 707 (P)

I/II M.PHARMACY (2nd SEMESTER)

MODEL QUESTION PAPER (PRACTICALS)

Time: 6 hrs                                                             Max Marks: 70

1. Synopsis : 15 Marks
2. Major Experiment : 25 Marks
3. Minor Experiment : 15 Marks
4. Viva-voce : 15 Marks

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).
I/II M.PHARMACY (2ND SEMESTER)
HERBAL DRUG DEVELOPMENT AND STANDARDIZATION (THEORY)

UNIT – 1 Herbal based drug Industries:
Types, Scope, Study of infrastructure, staff requirement, project profiles, plant and equipment, processing, research and development, regulatory requirement. Pilot scale up techniques, Industrial methods and preparation of standardized extracts, principle, methods, merits and demerits. Preparations of standardized extracts of Garcinia, Forskolin, Garlic, Turmeric and Capsicum.

UNIT – 2 Standardization of Herbal drugs:
Importance of Standardization and problems involved in the Standardization of Herbs, Standardization of Single Drugs and Compound Formulations, WHO Guidelines for Quality Standardized Herbal Formulations, Estimation of the Parameter Limits Used for Standardization, Herbal Extracts

UNIT – 3 Herbal drug Formulation Development:

UNIT- 4 Herbal drug foods:
Introduction, classification, different categories of functional ingredients, Nutraceuticals, Dietary fibres, Oligosaccharides, Polyunsaturated fatty acids (PUFA), Peptids and Proteins, Vitamins, Antioxidants, Prebiotics and Probiotics, Enzymes, Carotenoids, Fruits and Vegetables with health benefits, Medicinal herbs and their effects, Regulations for making health foods, Antidiabetic and Related Benefical properties of Indian Medicinal Plants.
UNIT-5 Herbal Cosmetics:
Introduction, definition, classification, Raw materials of herbal origin, incorporating the herbal extracts in various cosmetic formulations like Skin care preparations, Herbal Cosmetics for hairs, nails, teeth and mouth, Borderline and kindered preparations and standardization of these products.

UNIT-6 Bioassays:
Basic principles of bioassays, Official bioassays, experimental models and statistical designs employed, biological standardization of oxytocin and insulin.

Screening Methods for Biological activities: Introduction, Study of information retrieval methods of natural plants and herbal data bases. General methods of screening and review of natural products for the following biological activities. Anti bacterial activity, Anti fungal activity, Anti-viral activity, Anti oxidant activity and Anthelmintic activity

UNIT-7 Screening Methods for pharmacological activities:
Introduction, Study of information retrieval methods of natural plants and herbal data bases. General methods of screening and review of natural products for the following pharmacological activities.

Anti-neoplastic activity, Anti-fertility activity, Hepato protective activity, Analgesics activity, Anti inflammatory activity, Anti ulcer activity, Diuretic activity, Hypo glycemic activity, Anti psychotics activity, Anti depressant activity, Anti-hypertensive activity and Hypolipidemic activity
I/II M.PHARMACY (2nd SEMESTER)
HERBAL DRUG DEVELOPMENT & STANDARDIZATION (PRACTICALS)

01. Standardisation of Single Herbal drug formulation.
    (Tablets/Capsules)
02*. Evaluation of herbal drug dosage forms (Tablets / Capsules)
03*. Standardisation of herbal cosmetics (Creams/Lotions)
05. Bio-assay of digitalis.
06. Screening of Anti-bacterial activity for herbal formulation.
07*. Screening of Anti-fungal activity for herbal formulation.
08. Screening of Anti-viral activity for herbal formulation.
09*. Screening of Anthelmintic activity for herbal formulation.
10*. Screening of Hepato protective activity for herbal formulation.
11. Screening of Anti-inflammatory activity for herbal formulation.
12. Screening of Analgesic activity for herbal formulation.
13. Screening of Anti-Ulcer activity for herbal formulation.
15. Screening of Hypoglycemic activity for herbal formulation.
RECOMMENDED BOOKS:
2. Herbal Pharmacopoeia
3. Homeopathic Pharmacopoeia
4. Ayurvedic Pharmacopoeia
5. Text book of Pharmacognosy by Trease and Evans, ELBS
6. Ayurvedic formulary by IMPCOPS
8. The use of Pharmacological techniques for the evaluation of natural products by BN Chavan and RC Srimal (CDRI).
11. Pharmaceutical Organic Chemistry by Dr. Rama Rao, Nadendla
12. Organic Chemistry of Natural Products by Gurdeep R. Chatwal
13. Herbal Drugs by Sharma Arora
14. Herbal Drug technology by SS Agrawal, M Paridhavi
I/II M.PHARMACY (2nd SEMESTER)
HERBAL DRUG DEVELOPMENT AND STANDARDIZATION (THEORY)
MODEL QUESTION PAPER

TIME: 3HOURS  MAX MARKS: 70

ANSWER ANY FIVE QUESTIONS

1)  a) Enumerate the regulatory requirements & research and development of herbal based drug industries.
    b) Discuss the preparations of standardized extract of Garlic the Turmeric.
2)  a) Write in detail about the importance of standardization and problems involved in it.
    b) Discuss the WHO guidelines for quality standardized herbal formulation.
3)  Discuss in detail about selection of herbal ingredients, different dosage forms, evaluation & standardisation of Ayurvedic medicines.
4)  Write about
    i) Nutraceuticals
    ii) Dietary fibres
    iii) PUFA
    vi) Vitamins.
5)  Enumerate the different herbal cosmetic preparations available for hairs and nails. Write about the standardisation of these products.
6)  a) Write the basic principle of bioassays and write the bioassay of insulin
    b) Discuss the screening methods for antifungal activity
7)  Write the general methods of screening and review of natural products for
    a) Anti-neoplastic activity
    b) Hepato protective activity

MPH 709 (P)

I/II M.PHARMACY (2ND SEMESTER)
MODEL QUESTION PAPER (PRACTICALS)

Time: 6 hrs  Max Marks: 70

1. Synopsis : 15 Marks
2. Major Experiment : 25 Marks
3. Minor Experiment : 15 Marks
4. Viva-voce : 15 Marks

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).