Second Year

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A) FIRST TERM

1-GENERAL PHARMACOGNOSY AND MEDICINAL PLANTS

Lectures 5 hrs/week and practical 7.5 hrs/week for one semester.

- Seeds: Linseed, Nux. vomica, Foenugreek, Strophanthus, Datura stramonium, Black and white mustard, Cardamom, Calabar beans, Nutmeg, Colchicum and many others ....
- Fruits: Fennel, Anise, Coriander, Ammi visnaga, Ammi majus, Caraway, Cumin, Dill, Capsicum, Colocynth, Black pepper, Cubeb, Senna pods, Orange and lemon peels and many others ....
- Herbs: Mentha, Lobelia, Hyoscyamus muticus, Datura stramonium, Ergot, Broom and Savin tops, Vinca, Carrageen, Fucus, Citraria, mushrooms, cannabis, thyme, yeast, penicillium.
- Rhizomes: Rhubarb, Ginger, Filix mas, Hydrastis, Podophyllum, Galengal, Curcuma, Colchicum, white and green Hellebore, Valeriana, Garlic ...
- Roots: Liquoirce, Jalap, Calumba, Senega, Aconite, Rawolfia, Sarsaparilla, Ginseng, ....
- Unorganised drugs: Colophony, Asafaetida, Myrrh, Benzoins, Aloe, Gelatin, Agar-Agar, Gum acacia, Gum tragacanth, Opium, Balsams, Galbanum, ...
- Animal drugs: Ambergris, Musk, Cantharidis, Cod liver oil, Bees wax, Coccus, Wool fat, .....
2-PHARMACEUTICS
Lectures 4 hrs/week and practical 5 hrs/week for one semester.
- Interfacial phenomena.
- Adsorption at solid interfaces.
- Surface active agents and theology.
- Coarse dispersion (suspension, emulsion), colloidal dispersion.
- Semisolid dosage forms: Ointments, creams and poultices.
- Suppositories
- Aqueous solutions containing aromatic principles: syrups, solutions using mixed solvent systems; elixirs, alcohols and glycerites.

3-PHARMACY ADMINISTRATION
Lectures 2 hrs/week for one semester.
- Accounting principles (include nature and purposes of account and accounting records and recording financial transactions, preparing results of operation and financial position statements).
- Accounting information and it's role in planning, organizing, directing and controlling.

B) SECOND TERM
1-PHARMACEUTICAL ANALYTICAL CHEMISTRY
Lectures 6 hrs/week and practical 8 hrs/week for one semester.
- Environmental analysis.
- Spectrophotometry.
- Fluorimetry.
- Turbidimetry and nephelometry.
- Polarimetry, refractometry, atomic absorption spectroscopy and flame photometry.
- Differential spectrophotometry and potentiometry.
- Conductometry.
- Polarography.
- Chromatographic methods: Principles of chromatography, types of chromatography, classification of chromatographic techniques, instruments: TLC, gas chromatography, HPLC.
- Water quality control (water analysis).
- Analysis of oils and fats: Physical examination, chemical examination, identification tests for:
  drying, semi-drying and non-drying, cottonseed, arachis, seaame linseed, and fish "marine" oils.

Practical:
- Assay of potassium permanganate.
- pH effects (sulfanilamide, thymol blue).
- Molar ratio determination.
- Determination of pKa, fluorimetry, derivative spectroscopy, atomic absorption, flame photometry, polarimetry.
- Determination of hydrogen peroxide.
- Determination of potassium persulfate.
- Determination of calcium chloride (excess oxalic).
- Determination of reduced iron, analysis of Fe2+-Fe3+ mixture.
- Determination of ferrocyanide by bromate.
- Determination of Fe2+ using Cr2O72- using ceric sulphate.
- Determination of glycerol.
- Determination of cupper sulfate.
- Determination of phenol.
- Determination of glucose-sucrose mixture.
- Determination of iodine by Andrew's.
- Water analysis (acidity, alkalinity, hardness), dissolved oxygen-absorbed oxygen, ammonia heavy metals.
- Oils and fats (physical examination "specific gravity, refractive index", colour tests), acid value, saponification value, iodine value.
- Chromatography, turbidimetry and nephelometry.

2-PHARMACEUTICAL ORGANIC CHEMISTRY
Lectures 4 hrs/week and practical 5 hrs/week for one semester.
- Monocyclic aromatic hydrocarbons, aromatic compounds.
- Inductive and resonance effects.
- Theory of orientation.
- Aromatic sulphonic acids.
- Aromatic halogen compounds.
- Phenols and quinones.
- Aromatic nitro compounds and aromatic amino compounds.
- Aromatic alcohols, aldehydes and ketones.
- Aromatic acids, monocarboxylic acids with the carboxyl group in
the side-chain.
- Aromatic polynuclear hydrocarbons (naphthalene, anthracene, phenanthrene).
- Heterocyclic chemistry (introduction and nomenclature, five-membered rings "one hetero-atom", five-membered rings "two hetero-atoms", five-membered rings; condensed, six-membered rings "one hetero-atom", six-membered rings; condensed "quinoline, isoquinoline, acridine", acyclic compounds).
- Spectroscopic methods for identification of organic compounds (infrared spectrometry, nuclear magnetic resonance, mass spectrometry).

Practical:
- General information and common laboratory techniques.
- Preparations: acetylation reactions (acetanilide, aspirin), bromination reactions (p-bromoacetanilide, p-nitoraniline, 2,4,6-tribromoaniline, sym-tribromophenol), nitration reactions (p-nitroacetaniline, p-nitroaniline), diazotization and coupling reactions (phenylazo-B-naphthol), halogen reaction (iodoform).
- Extraction, recrystallization, melting point, boiling points and distillation, distillation under reduced pressure.
- Identification of some organic compounds by spectroscopic techniques (IR, NMR, MS), spectral problems.

3-PHARMACEUTICAL MICROBIOLOGY
Lectures 4 hrs/week and practical 4 hrs/week for one semester.
- General microbiology, immunology, systematic bacteriology, virology, mycology).
- Pharmaceutical microbiology.
- Chemotherapeutic agents "bacterial and viral".
- Assay of antibiotics.
- Methods of sterilisation: sterility testing, aseptic technique.
- Preservation of pharmaceutical preparations.
- Microbiological assay of accessory factors.
- Industrial microbiology: design of a fermentation unit-media for industrial fermentation,
  fermentation products, industrial uses of microorganisms in single step enzymatic processes.