

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD



**B. PHARMACY**  
**Course Structure and Syllabus of I Year 2009-2010**

I YEAR

Code	Subject	T	C	P	C
R9101	Remedial Mathematics/ Remedial Biology (R9107)	3+1/2+1	6/3	0/3 (R9108)	0/3
R9102	Dispensing and Hospital Pharmacy	3+1	6	3 (R9109)	3
R9103	Pharm. Inorganic Chemistry	3+1	6	3 (R9110)	3
R9104	Pharmaceutical Organic Chemistry-I	3+1	6	3 (R9111)	3
R9105	Anatomy, Physiology and Health education	3+1	6	3 (R9112)	3
R9106	English Language Communication Skills	2	2	2 (R9113)	2
	Total	22/21	32/29	14/17	14/17

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**(R9101) REMEDIAL MATHEMATICS**

**UNIT I**

**Algebra:**

**Arithmetic Progression-Geometric Progression- Permutations & combinations-Binomial theorem-partialfractions-Matrices-Determinants-Application of determinants to solve simultaneous equations (Cramer's Rule).**

**UNIT II**

**Trigonometry:** Trigonometric ratios and the relations between them Sin (A+B), Cos (A+B), Tan (A+B) formulae only. Trigonometric ratios of multiple angles-Heights and distances (simple 000 problems there on).

**UNIT III**

**Co-ordinate Geometry:** Distances between points-Area of a triangle, Co-ordinates of a point dividing a given segment in a given ratio-locus-equation to a straight line in different forms-Angle between straight lines-point of intersection.

**UNIT IV**

**Differential Calculus:** Continuity and limit: Differentiation, derivability and derivative, R.H. derivatives and L.H. derivatives, Differentiation, General theorems of derivation.

**UNIT V**

Derivatives of trigonometric functions (excluding inverse trigonometric and hyperbolic functions). Logarithmic differentiation. Partial differentiation maxima and minima (elementary).

**UNIT VI**

**Integral Calculus:** Integration as on inverse process of differentiation, definite integrals, integration by substitution, integration by parts, integration of algebraic function of  $E^x$  evolution of area in simple cases.

**UNIT VII**

**Differential equations:** Formation of a differential equation, order and degree, solution of first order differential equations.

**UNIT VIII**

Applications of 1<sup>st</sup> order and 1<sup>st</sup> degree \_ law of Natural growth and decay. Newton's Law of cooling Linear differential equation from Homogenous and non homogenous 2<sup>nd</sup> higher order differentiation

**TEXT BOOKS**

1. Intermediate first Year mathematics and
2. Intermediate Second year mathematics., printed and published by Telugu Academy, Himayatnagar, Hyderabad
3. Text book of Remedial Mathematics P. Seshagiri Rao
4. Higher Engineering Mathematics by Grewal.
5. Text book of Remedial Mathematics by Dr. A Ramakrishna Prasad Cengage Learning.

**Reference**

1. Pharmaceutical Arithmetic's by Mohd. Ali CBS publishers and distributor, New Delhi.
2. Comprehensive Remedial Mathematics for B. Pharmacy by Patkar. Shyam

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**(R9102) DISPENSING & HOSPITAL PHARMACY  
Section-A, Dispensing Pharmacy**

**UNIT-I**

**Genesis and Evolution of Pharmacy:** History of Pharmacy, origin and development of the Pharmacopoeias, History of Ayurveda, salient features of IP, USP and BP

**UNIT-II**

**Dispensing Pharmacy:** Principles of dispensing, form of prescription, handling of prescription, source of errors in prescription, care required in dispensing procedures including labeling of dispensed products. Weights and Measures, introduction to Latin terms, Percentage calculations, alligation method, proof spirit calculations, displacement value and calculations of isotonicity adjustment. General dispensing procedure- posology-calculations of doses.

**UNIT-III**

**Principles involved and procedures adopted in dispensing of the following classes of preparations.**

(i) Mixtures      ii) solutions      iii) emulsions      iv) powders      v) lotions & liniments      vi) ointments      vii) Sespensions  
**Definition of the following preparations like** creams, capsules, pastes, jellies, suppositories, ophthalmics, lozenges, pills, inhalations, paints, sprays and tablet triturates .

**Extraction and galenical products:** Principle and methods of extraction, preparation of infusion, tinctures, dry, soft liquid extracts.

**UNIT-IV**

**Incompatibilities:** Physical, chemical and therapeutic incompatibilities – methods of over coming and handling of prescriptions with incompatibility.

**Section-B, HOSPITAL PHARMACY**

**UNIT-V**

**Organization:** Organization of a hospital and hospital pharmacy, responsibilities of a hospital pharmacist, pharmacy and therapeutic committee.

**UNIT-VI**

**Drug Distribution:** Procedural manual, drug distribution, dispensing to out-patients, in-patients and ambulatory patient-dispensing of ancillary and controlled substances, drug information center.

**Unit VII**

**Hospital Management :** Budget preparation and implementation ,hospital formulary, organization of drug store ,purchase and inventory control, patient counseling, role of Pharmacist in community health care and education.

**UNIT-VIII**

**Records:** Prescription filling, drug profile, patient medication profile, cases on drug interaction, adverse reactions, idiosyncratic cases.

**TEXT BOOKS**

- 1 Cooper & Gunns Dispensing Pharmacy, CBS, Publ. and Distributors New Delhi.
- 2 Gupta AK, Health Education and Community Pharmacy, CBS, Publ. and Distributors New Delhi.
- 3 JS Quadry, Hospital Pharmacy.
- 4 Lorria & William, Essential dosage calculations.
- 5 Jain & Gupta, Modern dispensing Pharmacy

## REFERENCES

1. Lippincott Williams and Wilkins, Remington Pharmaceutical Sciences.
2. William Hassan, Hospital Pharmacy.
3. R.M Metha, Dispensing Pharmacy.
4. E.A. Rawlkins, Bentley's Text Book of Pharmaceutics, Elbs publ.
5. Hoover, Dispensing of Medication.
6. NK Jain, Health Education and Community Pharmacy by, CBS, Publ. and Distributors New Delhi.

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(R9103) PHARMACEUTICAL INORGANIC CHEMISTRY

**UNIT - I**

1. Classification of Inorganic Pharmaceuticals based on their applications and therapeutic uses.
2. Sources of impurities, quality control and test for purity
3. Qualitative tests for anion and cations
4. Limit tests for arsenic, heavy metals, lead, iron, chloride and sulphate.

**Note:** *Definition, Preparation, Assay principle, Limit tests and Uses of the compounds mentioned in Unit II to Unit VII*

**UNIT - II**

1. **Electrolytes:**
  - a. **Sodium and potassium replenishers:** Sodium chloride, compound sodium chloride solution (Ringer solution), potassium chloride, ORS.
  - b. **Calcium replenishers:** Calcium gluconate, dibasic calcium phosphate, calcium chloride.
2. **Acid base regulators:** Sodium bicarbonate, sodium lactate, sodium citrate/potassium citrate, sodium acetate, and ammonium chloride
3. **Dialysis fluids:** Haemodialysis fluids.

**UNIT III**

**Gastro-intestinal agents.**

1. **Acidifiers and Antacids:** Dilute hydrochloric acid, sodium acid phosphate, sodium bicarbonate, aluminium hydroxide gel, dried aluminium hydroxide gel, magnesium oxide (Magnesia), magnesium hydroxide mixture, magnesium trisilicate.
2. **Adsorbents and related drugs:** Light kaolin, heavy kaolin, and activated charcoal.
3. **Laxatives:** Magnesium sulphate, sodium phosphate.

**UNIT -IV**

1) **Mineral Nutrients / Supplements**

- (a) **Haematinics** – Ferrous sulphate, ferrous fumarate, ferrous gluconate, ferric ammonium citrate, iron and dextrose injection.
- (b) **Halogens:** Iodine, Iodides.

2) **Pharmaceutical aids:**

- (a) **Excipients:** Dicalcium phosphate, magnesium stearate, talc and calcium carbonate (Precipitated chalk).
- (b) **Suspending agents:** Bentonite, colloidal silica.
- (c) **Colorants:** Titanium oxide, Ferric oxide

**UNIT - V**

- (a) **Expectorants:** Ammonium chloride, potassium iodide.
- (b) **Emetics:** Potassium antimony tartarate, copper sulphate.
- (c) **Antidotes:** Sodium thiosulphate, sodium nitrite.

**UNIT -VI**

**Topical agents:**

- 1) **Astringents:** Zinc sulphate, calcium hydroxide, Bismuth sub carbonate.
- 2) **Topical protectants:** Zinc oxide, calamine, zinc stearate, talc, titanium-dioxide, heavy kaolin and light kaolin (only uses).
- 3) **Silicone polymers:** Activated dimethicone.
- 4) **Anti-Infectives:** Hydrogen peroxide solution, potassium permanganate, silver nitrate (silver protein), iodine, (solutions of iodine, povidone iodine), boric acid, zinc undecylenate, mercury compounds (yellow mercuric chloride)

## UNIT- VII

### **Dental products:**

- 1) **Fluorides:** Sodium fluoride, sodium monofluorophosphate and stannous fluoride.
- 2) **Oral antiseptics and Astringents:** Hydrogen peroxide, magnesium peroxide, zinc peroxide and mouth washes.
- 3) **Dentifrices:** Calcium carbonate, dibasic calcium phosphate, calcium phosphate, sodium metaphosphate and strontium chloride.
- 4) **Cements & fillers :** Zinc oxide (only uses).

## UNIT-VIII

### **Miscellaneous Medicinal Agents**

a)	Antineoplastics	:	Cisplatin
b)	Antidepressants	:	Lithium carbonate
c)	Diagnostic agents	:	Barium sulphate
d)	Surgical Aids	:	Plaster of Paris
e)	Antirheumatic agents	:	Sodium aurothiomalate
f)	Internal parasiticide	:	Sodium antimony gluconate
g)	Anti thyroid agents	:	Potassium perchlorate

### **TEXT BOOKS**

1. J.H Block, E.Roche, T.O Soine and C.O. Wilson, Inorganic Medical and Pharmaceutical Chemistry Lea & Febiger Philadelphia PA.
2. A.H.Beckett and J.B.Stenlake, Practical pharmaceutical chemistry, Part-I. The Athtone press, University of London, London.
3. P. Gundu Rao, Inorganic pharmaceutical chemistry; Vallabh Prakashan, Delhi.
4. Advanced Inorganic Chemistry by Satya prakash, G.D.Tuli
5. Jolly-Modern inorganic chemistry

### **REFERENCES**

1. L.M. Atherden, Bentley and Driver's Textbook of Pharmaceutical Chemistry Oxford University Press, London.
2. Indian Pharmacopoeia 1996, 2006.

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**(R9104) PHARMACEUTICAL ORGANIC CHEMISTRY-I**

**UNIT – I**

**Structure and Activity of Organic Molecules:** Shapes of organic molecules, bond lengths, bond angles and bond dissociation energies. Electronic effects in organic molecules: inductive effect, electromeric or mesomeric effect, hyperconjugation, concept of resonance; types of organic reagents and reactions.

**UNIT – II**

**A Study of Hydrocarbons:**

**Aliphatic/Alicyclic Hydrocarbons:** Nomenclature, isomerism (chain, conformational and geometrical) relative stabilities (heats of combustion and hydrogenation), ring stabilities of cyclohexane, chair-boat conformation, Bayer's strain theory and sachse-mohr theory. Free radical substitution reactions (halogenation) of alkanes.

**Alkenes:** Electrophilic addition reactions of alkenes, Markovnikov's rule, Kharasch effect, Bayer's oxidation (cis-hydroxylation, polymerisation).

**Alkadienes:** Stability & 1,4 addition reactions of conjugated alkadienes.

**Alkynes:** Acidity of 1-alkynes, formation of metal acetylides. Stereo specific reduction of alkynes. Addition of hydrogen halide (HCl) addition of water and keto-enol tautomerism.

**UNIT – III**

**Aromatic Hydrocarbons:** Kekule's structure of benzene, bond lengths, heats of hydrogenation and stability, molecular orbital picture of benzene, aromaticity, Huckel's rule, nomenclature of benzene derivatives, characteristic reactions of benzene, theory of reactivity and orientation in monosubstituted benzenes.

**Polynuclear aromatic hydrocarbons:** Nomenclature, structure and aromatic character of naphthalene, anthracene, phenanthrene and naphthacene resonance structures, electron density and reactivity. Electrophilic substitution, oxidation and reduction reactions.

**UNIT – IV**

**Halogen Compounds-Aliphatic:** Nomenclature, general methods of preparation, characteristic nucleophilic substitution reactions, factors that play role in  $SN^1$  and  $SN^2$ , Walden inversion, elimination reaction and Saytzeff's rule.

**Halogen Compounds-Aromatic:** Nomenclature, low reactivity of halo benzenes towards nucleophilic substitution, arenes.

**UNIT – V**

**Alcohols:** Nomenclature, classification, general methods of preparation, physical properties, hydrogen bonding, characteristic nucleophilic substitution reactions (replacement of -OH by -Cl), elimination reactions, and relative reactivities of  $1^\circ$ ,  $2^\circ$  and  $3^\circ$  alcohols, Meerwein Ponderff Verley reduction.

**Ethers:** Nomenclature, Williamson's synthesis, action of hydro iodic acid on ethers (Ziesel's method).

**Phenols:** Nomenclature, general methods of preparation, physical properties, acidity of phenols, stability of phenoxide ion, reactions of phenols, Kolbe-schmidt reaction stability of conjugated dienes, and Fries rearrangement, Reamer-Tiemann Reaction.

**UNIT – VI**

**Carbonyl Compounds:** Nomenclature, two important methods of preparation, polarity of carbonyl group, relative reactivities of carbonyl compounds, nucleophilic addition and addition-elimination reactions, oxidation-reduction reactions, aldol condensation, Cannizzaro reaction, benzoin condensation, Perkins reactions, Reformatsky reaction, Oppenauer oxidation.

**UNIT – VII**

**Carboxylic acids and their derivatives:**

**Carboxylic acids:** Nomenclature, intermolecular association, stability of carboxylate anion, two important methods of preparation, decarboxylation, functional groups reactions, reduction of carboxylic acids. a note on dicarboxylic acids.

**Acid derivatives:** (acid chlorides, anhydrides, esters and amides). Nomenclature, reactions like hydrolysis, reduction of esters and amides, Hofmann's degradation of amides. Brief account of preparation and properties of malonic and acetoacetic esters, their importance in organic syntheses.

#### **UNIT – VIII**

##### ***Nitrogen Compounds:***

**Nitro compounds:** Nomenclature, acidity of nitro compounds containing  $\alpha$ - hydrogens, reductive reactions of aromatic nitro compounds.

**Amines:** Nomenclature, basicity of amines, classification, relative reactivity, hinsberg method of separation, acylation reactions. Diazotisation and reactions of diazonium salts.

**Nitriles and isonitriles:** Nomenclature, two methods of synthesis, reactivity and functional reactions.

#### **TEXT BOOKS**

1. T.R.Morrison and R.N.Boyd, Organic chemistry, pentice hall of India private limited, New Delhi.
2. Ball & Ball, Advanced pharmaceutical organic chemistry.
3. Bruce, Organic chemistry.
4. Jerry March, Advanced Organic Chemistry
5. carey- oraganic chemistry
6. Pillai- oraganic chemistry

#### **REFERENCES**

1. Jerry March, Reactions and Mechanism 4<sup>th</sup> edition.
2. I.L. Finar Vol.I. & Vol. II., The Fundamentals Principles of Organic Chemistry, ELBS/Longman.
3. Stenlake B.J, Medicinal and pharmaceutical chemistry-Vol-I



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**(R9105) ANATOMY PHYSIOLOGY AND HEALTH EDUCATION**

**UNIT-I**

**Scope of anatomy and physiology and basic terminology used in these subjects.** Structure of cell, its components and their function. Elementary tissues of the human body: epithelial, connective, muscular and nervous tissues, their sub- types and characteristics. Body fluids, Homeostasis

**UNIT-II**

**Skeletal system:** Structure, composition and functions of skeleton classification of joints, types of movements at joints,

**Skeletal muscles:** Gross anatomy, physiology of muscle contraction, physiological properties of skeletal muscles and their disorders. rheumatoid arthritis, gout

**UNIT-III**

**Haemopoietic system:** Composition and functions of blood and its elements, their disorders, blood groups and their significance, mechanism of coagulation, disorders of platelets and coagulation. Anemias and its types. common types of neoplasms.

**UNIT-IV**

**Lymph and Lymphatic System:** Composition, formation and circulation of lymph; disorders of lymph and lymphatic system. Basic physiology and functions of spleen.

**UNIT-V**

**Cardiovascular system:** Basic anatomy of the heart. Physiology of heart, blood vessels and circulation. Basic pulmonary, coronary, hepatic, system, understanding of cardiac cycle, heart sounds and electrocardiogram. blood pressure and its regulation. Brief outline of cardiovascular disorders like hypertension, hypotension, atherosclerosis, angina, myocardial infarction, congestive heart failure and cardiac arrhythmias.

**UNIT-VI**

**Concepts of health & disease,** disease causing agents and prevention of disease.  
balanced diet and nutritional deficiency disorders,

**Demography and family planning:**

Demography cycle, population problem family planning and various contraceptive methods. Medical termination of pregnancy.

**UNIT-VII**

**First Aid:** Emergency treatment of shock, snakebites, burns, poisoning, fractures and resuscitation methods.

**UNIT-VIII**

**Brief outline of communicable diseases,** their causative agents, modes of transmission and prevention (chicken pox, measles, influenza, diphtheria whooping cough, tuberculosis, poliomyelitis, hepatitis, cholera, typhoid, food poisoning, helminthiasis, malaria, filariasis, rabies, trachoma, tetanus, leprosy, syphilis, gonorrhoea, and Aids).

**TEXT BOOKS**

1. Tortora, G.J and Anagnostokas, Principles of Anatomy and Physiology, N.P Harper & Row Publishers N.Y
2. Elaine N. Marieb, Essential of Human Anatomy & Physiology
3. Ross & Willson, Text Book of Human Anatomy, M.J. Mycek S.B Gerther and MMP
4. Rizzo, Fundamental of Anatomy Physiology.

**REFERENCES**

1. Guyton, Textbook of Medical Physiology, AC Guyton WB Saunders Company, 1995.

2. K. Sembulingam and Prema Sembulingam, Essentials of Medical Physiology, 3rd Edition, Jaypee Bros., New Delhi.
3. M.N.Gosh, Human Physiology
4. Julia F. Gui, Learning Human Anatomy: A Laboratory Text
5. Mc Kinley, Human Anatomy.

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**(R9106) ENGLISH LANGUAGE COMMUNICATION SKILLS**

**UNIT – I**

Humour from **LEARNING ENGLISH: A Communicative Approach, Orient** Longman, 2005

1. The Sounds of English – Vowels and Diphthongs, oral presentations (prepared), Just A Minute (JAM) Sessions.

**UNIT - II**

2. Healths and Medicine from **LEARNING ENGLISH: A Communicative Approach, Orient** Longman, 2005
3. The Sounds of English – Consonants, oral presentations (prepared), Just A Minute sessions).

**UNIT - III**

4. Environment from **LEARNING ENGLISH: A Communicative Approach, Orient** Longman, 2005.
5. Stress in English – Oral presentations (extempore), Just A Minute sessions

**UNIT - IV**

6. Inspiration from **LEARNING ENGLISH: A Communicative Approach, Orient** Longman, 2005.
7. Intonation - Oral presentations (extempore), Just A Minute sessions

**UNIT -V**

8. Human Interest from **LEARNING ENGLISH: A Communicative Approach, Orient** Longman, 2005.
9. Role Play and Situational Dialogues – Informal, Semi- formal and Formal.

**UNIT – VI**

10. Media from **LEARNING ENGLISH: A Communicative Approach, Orient** Longman, 2005.
11. Role Play and Situational Dialogues – Informal, Semi-formal and Formal.

*\* Exercises from the lessons not prescribed for detailed study shall also be used for classroom tasks.*

**UNIT – VII**

**Exercises on**

Reading and Writing Skills  
Reading Comprehension  
Situational dialogues  
Interview Skills  
Group Discussion  
Letter writing  
e - mail writing and e – mail etiquette  
Report writing – Preparing a rough draft, editing and preparing the final report.

**UNIT – VIII**

**Remedial Grammar to be dealt with through practice exercises and activities covering**

Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions, Tense and aspect

**Vocabulary development covering**

Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

**TEXTBOOKS PRESCRIBED:**

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Eight Units**, are prescribed:

***For Detailed study***

- **LEARNING ENGLISH: A *Communicative Approach***, Hyderabad: Orient Longman, 2006. (Six Selected Lessons and exercises from all the nine units)

***For Practice in Listening and Speaking skills***

- **A Practical Course in English Pronunciation**, (with two audio cassettes) by J. Sethi, Kamlesh Sadanand and D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.

**REFERENCES**

1. **Strengthen Your English**, Bhaskaran & Horsburgh, Oxford University Press
2. **Basic Communication Skills for Technology**, Andrea J Rutherford, Pearson Education Asia.
3. **Murphy's English Grammar with CD**, Murphy, Cambridge University Press.
4. **English Skills for Technical Students**, WBSCTE with British Council, Orient Longman
5. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
6. **A textbook of English Phonetics** for Indian Students by T.Balasubramanian (Macmillan)

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(R9107) REMEDIAL BIOLOGY

**UNIT I**

Methods of classification of plants.

**Plant cell:** It's detailed structure, mitosis, meiosis different types of plant tissues and their functions.

**UNIT II**

Simple and compound microscopes used in biology; section cutting; staining and mounting of sections.

**Morphology and histology** of root, stem, bark, wood, leaf, flower, fruit and seed. Modifications of root and stem.

**UNIT III**

**General survey of animal kingdom:** structure and life history of parasites illustrated by Amoeba, Entamoeba, Trypanosoma, Plasmodium, Taenia, Ascaris, Schistosoma, Oxyuris and Ancylostoma.

**UNIT IV**

General structure and life history of insects like Cockroach, Mosquito, Housefly, Mite and Silkworm. Relationship of insects with medicinal crops.

**SUGGESTED TEXT BOOKS**

1. Intermediate First Year and Second Year Botany / Zoology Text Books printed and published by Telugu Academy, Himayatnagar, Hyderabad.
2. A.C. Dutta, Text Book of Botany
3. Botany for Degree students Vol I & II by B.P. Pandey
4. Enger- Concepts biology

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**(R9108) REMEDIAL BIOLOGY LAB**

- a. Care and uses of microscope
- b. Gross identification of slides of structure and life cycle of plants/animals mentioned in theory.
- c. Morphology of plant parts indicated in theory.
- d. Preparation, Microscopic Examination of stem, root and leaf of mono and dicot leaves.
- e. Structure of human parasites and insects mentioned in the theory with the help of specimens.

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**(R9109) DISPENSING & HOSPITAL PHARMACY LAB**

1. Dispensing of prescriptions falling under the categories; Mixtures, solutions, emulsions, creams, ointments, powders, pastes, lotions, liniments, inhalations, paints. etc.
2. Identification of various types of incompatibilities in a prescription, correlation thereof and dispensing of such prescriptions.
3. Dispensing procedures involving pharmaceutical calculations, pricing of prescriptions and dosage calculations for paediatric and geriatric patients.
4. Dispensing of prescriptions involving adjustment of tonicity.
5. Categorization and storage of pharmaceutical products based on legal requirements of labelling and storage.
6. Project report on visit to the community pharmacy for Counseling on the rational use of drugs and aspects of health care.
7. Preparation of Pharmacopoeial extracts and galenical products utilizing various methods of extraction.

**Text Book**

1. Dispensing and Hospital pharmacy Lab by Sanmathi & Mehta

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**(R9110) PHARMACEUTICAL INORGANIC CHEMISTRY LAB**

**List of experiments:**

**A) Limit tests for the following as per the procedure given in Indian Pharmacopoeia (1996 – including the latest addenda)**

- 1) Chlorides
- 2) Sulphates
- 3) Heavy metals
- 4) Iron
- 5) Arsenic (demonstration)

- B)**
- 6) Balances and Weighing; Calibration of weights, Pipette and Burette.
  - 7) Preparation and standardization of Hydrochloric acid solution (0.1N).
  - 8) Preparation and standardization of Potassium permanganate solution (0.1N & 0.1M).
  - 9) Preparation of a primary standard solution of 0.1N Potassium hydrogen-phthalate.
  - 10) Preparation and standardization of 0.1N EDTA solution.
  - 11) Preparation and purification of Boric acid.
  - 12) Preparation and purification of Sodium citrate.
  - 13) Preparation and purification of Potash alum.
  - 14) Preparation and purification of Magnesium stearate.
  - 15) Assay of sodium bicarbonate and assay of Boric acid (Neutralization).
  - 16) Assay of Calcium gluconate (or) any calcium compounds (Complexometry).
  - 17) Assay of Copper sulphate (Redox titration).
  - 18) Assay of Sodium acetate (Non-aqueous titration).
  - 19) Assay of Ferrous sulphate (Oxidation-reduction / Redox titration).
  - 20) Exercises related to assay by Gravimetric method.

**REFERENCES**

1. Indian Pharmacopoeia - 1996.
2. Vogel's Qualitative Analysis
3. Pharmaceutical Inorganic Chemistry, Subba Rao



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**(R9111) PHARMACEUTICAL ORGANIC CHEMISTRY-I LAB**

Introduction to Equipment & Glassware, Recrystallization method, details of M.P, B.P and distillation

**I. Preparation of organic compounds (each involving a specific organic reaction covered in theory)**

- |     |                                 |   |   |
|-----|---------------------------------|---|---|
| 1.  | N-Acetylation                   | : | Preparation of Acetanilide from Aniline   |
| 2.  | O-Acetylation                   | : | Preparation of Aspirin from Salicylic acid  |
| 3.  | Nuclear Bromination             | : | Preparation of p-Bromoacetanilide from Acetanilide                                  |
| 4.  | Hydrolysis                      | : | Preparation of p-Bromoaniline from p-Bromoacetanilide                               |
| 5.  | Nuclear Nitration               | : | Preparation of m-Dinitrobenzene from nitrobenzene                                   |
| 6.  | Oxidation                       | : | Preparation of Benzoic acid from Benzyl chloride                                    |
| 7.  | Esterification                  | : | Preparation of n-Butylacetate from n-Butylalcohol                                   |
| 8.  | Etherification                  | : | Preparation of $\beta$ -Naphthyl methyl ether from $\beta$ -Naphthol                |
| 9.  | $\alpha$ -Halogenation          | : | Preparation of Iodoform from Oxidation of Acetone                                   |
| 10. | Extensive Nuclear Substitution: |   | Preparation of Tribromophenol or Bromination Tribromoaniline from Phenol or Aniline |

**II. Systematic qualitative Analysis (Identification) of Monofunctional Organic Compounds:**

Avoid water-soluble compounds, and compounds containing more than one functional group; at least six individual compounds to be analyzed.

**REFERENCES**

1. Vogel's Text Book of Practical Organic Chemistry, 5<sup>th</sup> Edition.
2. R.K. Bansal, Laboratory Manual of Organic Chemistry.
3. O.P. Agarwal, Advanced Practical Organic Chemistry.
4. F.G.Mann & B.C. Saunders, Practical Organic Chemistry.

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HYDERABAD**

**I Year B. Pharmacy**

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**(R9112) ANATOMY AND PHYSIOLOGY LAB  
(21 Experiments)**

1. Study of human skeleton – 2 Experiments
2. Study of different systems with the help of charts and models – 2 Experiments.
3. Microscopic study of different tissues – 3 Experiments.
4. Estimation of Haemoglobin in blood, Determination of bleeding time, clotting time – 3 Experiments.
5. Estimation of R.B.C. count – 2 Experiments.
6. Estimation of W.B.C count – 2 Experiments.
7. Estimation of D.L.C. – 2 Experiments.
8. Recording of body temperature, pulse rate and blood pressure, basic understanding of electrocardiogram-PQRST waves and their significance – 3 Experiments.
9. Determination of vital capacity, experiments on spirometry – 2 Experiments.

**REFERENCES**

1. Plummer, Practical Biochemistry

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD**

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**(R9113) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

**1. Introduction**

The introduction of the English Language Lab is considered essential at 1<sup>st</sup> year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

**2. Objectives:**

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

**3. Syllabus:**

The following course content is prescribed for the English Language Communication Skills Lab:

- Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- Vocabulary building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.
- Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.
- Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading.
- Technical Report writing – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.

**4. Minimum Requirement:**

**The English Language Lab shall have two parts:**

- i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

**System Requirement ( Hardware component):**

*Computer network with Lan with minimum 60 multimedia systems with the following specifications:*

- i) P – IV Processor
  - a) Speed – 2.8 GHZ
  - b) RAM – 512 MB Minimum
  - c) Hard Disk – 80 GB
- ii) Headphones of High quality

## 5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

### Suggested Software:

- **Clarity Pronunciation Power** – part II
- **Oxford Advanced Learner's Compass**, 7<sup>th</sup> Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**( KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed,**
  - **Positive Thinking,**
  - **Interviewing Skills,**
  - **Telephone Skills,**
  - **Time Management**
  - **Team Building,**
  - **Decision making**
  
- **English in Mind**, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

## 6. Books Recommended:

1. **Effective Technical Communication**, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
2. **A Course in English communication** by Madhavi Apte, Prentice-Hall of India, 2007.
3. **Communication Skills** by Leena Sen, Prentice-Hall of India, 2005.
4. **Academic Writing- A Practical guide for students** by Stephen Bailey, Rontledge Falmer, London & New York, 2004.
5. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
6. **Body Language- Your Success Mantra** by Dr. Shalini Verma, S. Chand, 2006.
7. **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice**, New Age International (P) Ltd., Publishers, New Delhi.
8. Books on **TOEFL/GRE/GMAT/CAT** by Barron's/cup
9. **IELTS series with CDs** by Cambridge University Press.
10. **Technical Report Writing Today** by Daniel G. Riordan & Steven E. Pauley, Biztantra Publishers, 2005.
11. **Basic Communication Skills for Technology** by Andra J. Rutherford, 2<sup>nd</sup> Edition, Pearson Education, 2007.
12. **Communication Skills for Engineers** by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
13. **Objective English** by Edgar Thorpe & Showick Thorpe, 2<sup>nd</sup> edition, Pearson Education, 2007.
14. **Cambridge Preparation for the TOEFL Test** by Jolene Gear & Robert Gear, 4<sup>th</sup> Edition.
15. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press.

## DISTRIBUTION AND WEIGHTAGE OF MARKS:

### **English Language Communication Skills Lab Practicals:**

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.