



## R13 B .Pharmacy I year syllabus

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### JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

(Established by Andhra Pradesh Act No.30 of 2008)

Kukatpally, Hyderabad – 500 085, Andhra Pradesh (India)

#### B.PHARMACY

#### R13 COURSE STRUCTURE AND SYLLABUS

##### I YEAR

Code	Subject	T	C	P	C
R13101	Remedial Mathematics/ Remedial Biology (R13107)	3+1/2+1	6/3	0/3 (R13108)	0/3
R13102	Dispensing and General Pharmacy	3+1	6	3 (R13109)	3
R13103	Pharm. Inorganic Chemistry	3+1	6	3 (R13110)	3
R13104	Pharmaceutical Organic Chemistry-I	3+1	6	3 (R13111)	3
R13105	Anatomy, Physiology and Health education	3+1	6	3 (R13112)	3
R13106	English	2	2	2 (R13113)	2
	Total	22/21	32/29	14/17	14/17

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## (R13101) REMEDIAL MATHEMATICS

**Objective:** This is an introductory course in mathematics, the subject deals with introduction to algebra, trigonometry, differential calculus, integral calculus etc.

**UNIT I****Algebra:**

Permutations & combinations - Binomial theorem –Partial fractions (addition, subtraction & multiplication) –Matrices – Determinants -Application of determinants to solve simultaneous equations (Cramer's Rule).

**UNIT II**

**Trigonometry:** measurement of angles, trigonometry functions, compound angles, trigonometry ratios of multiple angles ( $\sin 2\theta$ ,  $\cos 2\theta$ ,  $\tan 2\theta$ ), Heights and distances (All simple problems only).

**Co-ordinate Geometry:** Distances between two points, Area of a triangle, division of line segment, locus.

**UNIT III**

**Differential Calculus:** Continuity and limit: Differentiation, derivative of product, derivative of function, derivation of a fraction of functions

Derivatives of trigonometric functions (excluding inverse trigonometric and hyperbolic functions). Derivatives of Logarithmic and exponential functional, partial dedifferentiation, maxima and minima (all simple problems)

**UNIT IV**

**Integral Calculus:** integration of algebraic and exponential functions, Integration of trigonometric functions, integration by parts, integration by the method of substitution, definite integrals, areas and curves (all simple problems)

**UNIT V**

**Differential equations:** Formation of a differential equation, equation of 1<sup>st</sup> order and 1<sup>st</sup> degree, Homogenous, exact differential equation

**Outcome:** The student will learn the basics of mathematics which will be helpful in pharmaceutical calculation in the higher classes

**TEXT BOOKS**

1. Intermediate first Year mathematics and
2. Intermediate Second year mathematics., printed and published by Telugu Academy, Himayatnagar, Hyderabad
3. Remedial Mathematics by Shahnaz Bathul
4. Pharmaceutical Arithmetic's by Mohd. Ali CBS publishers and distributor, New Delhi.
5. Higher Engineering Mathematics by Grewal.
6. Text book of Remedial Mathematics by Dr. A Ramakrishna Prasad Cengage Learning.

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## (R13102) DISPENSING &amp; GENERAL PHARMACY

## Section-A, Dispensing Pharmacy

**Objective:** The student shall be given orientations to know the origin of pharmacopoeias on dispensing procedure of medicines, pharmaceutical calculation, and interpretations of incompatibilities.

## UNIT I

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

Pharmacy Education – D. Pharm, B Pharm, M.Pharm, Pharma-D, Qualification for getting license.

**b. 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 II

**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) Suspensions | (viii) Syrups |
| (ix) Suppositories.     |                |                   |               |

**Definition of the following preparations like** creams, capsules, pastes, jellies, suppositories, ophthalmics, lozenges, pills, inhalations, paints, sprays and tablet triturates .

## UNIT III

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

## Section-B, GENERAL PHARMACY

## UNIT IV

## Pharmaceutical ethics

Introduction to Pharmaceutical ethics, ethical guidelines for retail pharmacist / community Pharmacist, manufacturing Pharmacist and pharmaceutical researcher

## UNIT V

**a. Fundamental operations:** Weighing, measurement of liquids, procedure of dispensing solution.

**b. Colors:** Reasons for coloring pharmaceutical preparations, coloring of tablets, capsules and non-injectable fluids, Desirable properties of coloring agent, different types of coloring agents.

**c. Excipients:** Types of flavouring agents, preservatives & stabilisers

**Outcomes:** Student will be familiar with the Hospital pharmacy organization, drug distribution procedures, dispensing, storage, incompatibilities and patient related factors.

## 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. Pharmacoethics: A problem based approach by G. Vidya Sagar

## 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.
7. Modern Dispensing and Hospital Pharmacy by N.K Jain and Dr, G.D. Gupta

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## (R13103) PHARMACEUTICAL INORGANIC CHEMISTRY

**Objective:** The subject has been designed to make the students understand different categories of inorganic drugs/ compounds which are used as medicinal agents

**UNIT I**

1. Classification of Inorganic Pharmaceuticals based on their applications and therapeutic uses.
2. Sources of impurities in pharmaceutical substances.
3. Test for purity
  - (a) Setting property of plaster of paris
  - (b) Ammonium compounds in sodium bicarbonate
  - (c) Oxalate in sodium citrate.
  - (d) Barium and thiocyanate in Ammonium chloride and
4. Qualitative tests for anion and cations
5. 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 V*

**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.
4. **Mineral Nutrients / Supplements**
  - (a) **Haematinics** – Ferrous sulphate, ferrous fumarate, ferrous gluconate, ferric ammonium citrate, iron and dextrose injection.
  - (b) **Halogens:** Iodine, Iodides.
5. **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-IV**

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

**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-V

##### 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).

##### 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     |

**Outcome:** The knowledge gained by the student after studying the subject in detailed manner will be applicable to study and understand the concept for higher classes.

##### TEXT BOOKS

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

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## (R13104) PHARMACEUTICAL ORGANIC CHEMISTRY-I

**Objective:** The organic compounds are classified based on their functional groups and character. The basic principles and mechanisms of different types of organic reactions are explained in an elaborative manner.

## UNIT I

**a. 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.

**b. 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.

**c. 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.

**d. 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 II

**a. 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.

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

## UNIT III

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

**b. 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°, 2° and 3° alcohols, Meerwein Ponderoff Verley reduction.

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

**d. 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 IV

**a. 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.

**b. 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 V

**Nitrogen Compounds:**

**a. Nitro compounds:** Nomenclature, acidity of nitro compounds containing α- hydrogens, reductive reactions of aromatic nitro compounds.

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

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

**Outcome:** The detailed study on the mechanisms involved in various reactions would help the students to

understand the synthesis of higher organic compounds which would be dealt in future classes.

**TEXT BOOKS**

1. T.R.Morrison and R.N.Boyd, Organic chemistry, pentice hall of India private Limited, New Delhi.
2. I.L. Finar Vol.I. & Vol. II., The Fundamentals Principles of Organic Chemistry, ELBS/Longman.
3. Carey- oraganic chemistry

**REFERENCES**

1. Jerry March, Reactions and Mechanism 4<sup>th</sup> ed.
2. Jerry March, Advanced Organic Chemistry
3. Ball & Ball, Advanced pharmaceutical organic chemistry.
4. Bruce, Organic chemistry.
5. Pillai- oraganic chemistry
6. A Text book of Organic Chemistry by Tiwari – Vikas publications

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## (R13105) ANATOMY PHYSIOLOGY AND HEALTH EDUCATION

**Objectives:** This course is designed to impart a fundamental knowledge on the structure and functions of the human body. The overall anatomy and physiology of organ systems and their coordination are being dealt.

**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

**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 II**

**Haemopoietic system and Lymphatic 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, lymph nodes, vessels, lymph organs.

**Cardiovascular system:** Basic anatomy, physiology and conduction system of heart, blood vessels and circulation. Basic pulmonary, coronary, hepatic, system, understanding of cardiac cycle, cardiac output, 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 III**

**Digestive System:** Gross anatomy of the gastro-intestinal tract, functions of its different parts including those of liver, pancreas and gall bladder, various gastrointestinal secretions and their role in the absorption and digestion of food, peptic ulcer, ulcerative colitis, hepatic disorder, cholecystitis.

**UNIT IV**

Concept of health and diseases: 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 V**

**Brief outline of communicable diseases,** 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).

**Outcome:** Describes the structure and functions of various organs of the human body and mechanisms in the maintenance of normal functioning and disease state are known.

**TEXT BOOKS**

1. Tortora, G.J and Anagnostokas, Principles of Anatomy and Physiology, N.P Harper & Row Publishers N.Y
2. Ross & Willson, Text Book of Human Anatomy, M.J.Mycek S.B Gerther and MMPER
3. Fundamentals of Anatomy & Physiology by Donald C Rizzo
4. Human Anatomy and Physiology with health education by Padma B Sanghani

**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. Elaine N. Marieb, Essential of Human Anatomy & Physiology
6. C.C.Chatterjee, Human Physiology.
7. Mc Kinley, Human Anatomy.
8. Rizzo, fundamental of Anatomy Physiology.
9. Cinnamon.V, Jennifer. R, Andrew.R, Seeley's Fundamentals of human anatomy and physiology
10. Atlas of anatomy by Anne M Glory, Brian R Macpherson, Lawrence M Ross
11. Essentials of human physiology of pharmacy by Laurie Kelly Mc Lorry



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## (R13106) ENGLISH

**1. INTRODUCTION:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. *However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.*

**2. OBJECTIVES:**

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

**LEARNING OUTCOMES:**

- Usage of English Language, written and spoken.
- Enrichment of comprehension and fluency
- Gaining confidence in using language in verbal situations.

**SYLLABUS:****Listening Skills:**

Objectives

- To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

*Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.*

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

**Speaking Skills:**

Objectives

- To make students aware of the role of speaking in English and its contribution to their success.
- To enable students to express themselves fluently and appropriately in social and professional contexts.

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe - Functional English for Success**)
- Just A Minute(JAM) Sessions.

**Reading Skills:**

Objectives

- To develop an awareness in the students about the significance of silent reading and comprehension.
  - To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text

- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Scanning
- Recognizing coherence/sequencing of sentences

**NOTE :** *The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.*

**Writing Skills :**

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

- Writing sentences
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Note Making
- Formal and informal letter writing
- Describing graphs using expressions of comparison

**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 Five Units, are prescribed:**

**For Detailed study: First Textbook: "Skills Annexe -Functional English for Success",** Published by Orient Black Swan, Hyderabad

**For Non-detailed study**

1. **Second text book "Epitome of Wisdom",** Published by Maruthi Publications, Guntur

The course content and study material is divided into **Five Units.**

**Unit –I:**

1. Chapter entitled '**Wit and Humour**' from '**Skills Annexe**' -**Functional English for Success**, Published by Orient Black Swan, Hyderabad
2. Chapter entitled '**Mokshagundam Visvesvaraya**' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.

L-Listening For Sounds, Stress and Intonation

S-Greeting and Taking Leave, Introducing Oneself and Others (Formal and Informal Situations)

R- Reading for Subject/ Theme

W- Writing Paragraphs

G-Types of Nouns and Pronouns

V- Homonyms, homophones synonyms, antonyms

**Unit –II**

1. Chapter entitled "**Cyber Age**" from "**Skills Annexe -Functional English for Success**" Published by Orient Black Swan, Hyderabad.

2 Chapter entitled '**Three Days To See**' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.

L – Listening for themes and facts

S – Apologizing, interrupting, requesting and making polite conversation

R- for theme and gist

W- Describing people, places, objects, events

G- Verb forms

V- noun, verb, adjective and adverb

**Unit –III**

1. Chapter entitled '**Risk Management**' from "**Skills Annexe -Functional English for Success**" Published by Orient Black Swan, Hyderabad

- Chapter entitled '*Leela's Friend*' by R.K. Narayan from "*Epitome of Wisdom*", Published by Maruthi Publications, Hyderabad

L – for main points and sub-points for note taking  
S – giving instructions and directions; Speaking of hypothetical situations  
R – reading for details  
W – note-making, information transfer, punctuation  
G – present tense  
V – synonyms and antonyms

#### Unit –IV

- Chapter entitled '*Human Values and Professional Ethics*' from "*Skills Annexe -Functional English for Success*" Published by Orient Black Swan, Hyderabad

- Chapter entitled '*The Last Leaf*' from "*Epitome of Wisdom*", Published by Maruthi Publications, Hyderabad

L -Listening for specific details and information  
S- narrating, expressing opinions and telephone interactions  
R -Reading for specific details and information  
W- Writing formal letters and CVs  
G- Past and future tenses  
V- Vocabulary - idioms and Phrasal verbs

#### Unit –V

- Chapter entitled '*Sports and Health*' from "*Skills Annexe -Functional English for Success*" Published by Orient Black Swan, Hyderabad

- Chapter entitled '*The Convocation Speech*' by N.R. Narayanmurthy' from "*Epitome of Wisdom*", Published by Maruthi Publications, Hyderabad

L- Critical Listening and Listening for speaker's tone/ attitude  
S- Group discussion and Making presentations  
R- Critical reading, reading for reference  
W-Project proposals; Technical reports, Project Reports and Research Papers  
G- Adjectives, prepositions and concord  
V- Collocations and Technical vocabulary  
Using words appropriately

\* Exercises from the texts not prescribed shall also be used for classroom tasks.

#### REFERENCES :

- Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
- Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
- English Grammar Practice, Raj N Bakshi, Orient Longman.
- Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
- Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
- Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
- Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
- Technical Communication, Meenakshi Raman, Oxford University Press
- Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
- Grammar Games, Renuvolcuri Mario, Cambridge University Press.
- Murphy's English Grammar with CD, Murphy, Cambridge University Press.
- Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
- ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
- Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
- Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw –Hill.
- An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
- A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
- Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
- A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

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(R13107) REMEDIAL BIOLOGY

**Objective:** This is an introductory course in biology which gives detailed study on natural sources such as plant and animal origin. This subject deals with the plant cell, animal cell classifications plant kingdom and study of animal issues and study about frogs and some animals.

**UNIT I**

**Plant cell and tissues:** ultra structure of plant cell and its inclusions. Cell division-mitosis and meiosis. Types of tissues and their functions, tissue systems.

**UNIT II**

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

**UNIT III**

**Taxonomy:** Systemic position and classification of following families: leguminaceae, umbelliferae, apocyanaceae, solanaceae and liliaceae.

**UNIT IV**

**Animal cells and tissues:** ultrastructure of animal cell, cell division, types of cells and tissues and their functions  
**Study of anatomy of frog;** Basic study of digestive system, CVS, nervous system, respiratory system, genito-urinary system, musculoskeletal system.

**UNIT V**

Structure and life history of parasites illustrated by Amoeba, Entamoeba, Trypanosome, Plasmodium, Taenia, Ascaris, Schistosoma, Oxyuris and Ancylostoma

**Outcome:** The student will learn details about plant and animal cells plant taxonomy classification and some aspects of physiology of frogs and animals.

**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. Botnay for Degree students Vol I & II by B.P. Pandey
4. Enger- Concepts biology

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**(R13108) REMEDIAL BIOLOGY LAB**

- a. Introduction to simple and compound microscope and their handling
- b. Morphological study of various plant parts
- c. Study of histology of monocot root, stem, leaf and dicot root, stem and leaf
- d. Systemic study of representatives of following families: apocyanaceae, solanaceae, three sub families of leguminaceae and liliaceae
- e. Demonstration of various systems of frog
- f. Study of structure of human parasites and insects mentioned in theory with the help of specimen.
- g. Microscopic examination of specimens slides related to plant and animal tissues

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**(R13109) DISPENSING & GENERAL PHARMACY LAB**

1. Dispensing of prescriptions falling under the categories; Mixtures, solutions, emulsions, creams, ointments, powders, pastes, lotions, liniments, inhalations, paints, syrups, Suppositories 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.

**REFERENCES:**

1. Pharmaceutics –I, Practical manual by N.K.Jain, Vijay Mishra
2. dispensing pharmacy practical manual by B.S.Sanmethi, K.Mehta and Anshu Gupta

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## (R13110) 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 - 2010.
2. Vogel's Qualitative Analysis

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## (R13111) PHARMACEUTICAL ORGANIC CHEMISTRY-I LAB

**I Introduction to Equipment & Glassware**

1. Determination of melting point/boiling point by Thiels method.
2. Determination of Mixed melting point for organic compounds.
3. Recrystallization (Purification including decolourization) of two organic compounds.
4. Purification and drying of organic solvents.

**II. 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

**III. 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.
5. Organic Chemistry a lab manual, Cengage learning India Pvt. Ltd. By Pavia
6. Advanced Practical Organic Chemistry, Vishoi-Vikas Publications.

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(R13112) ANATOMY, PHYSIOLOGY & HEALTH EDUCATION  
(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
2. Elaine N. Marieb, Human Anatomy & Physiology.
3. A.K. Chatterjee, Human Physiology
4. C.L. Ghai, Practical Physiology



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## ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

**Objectives**

- ☒ To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- ☒ To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ☒ To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- ☒ To improve the fluency in spoken English and neutralize mother tongue influence
- ☒ To train students to use language appropriately for interviews, group discussion and public speaking

**Learning Outcomes:**

1. Better Understanding of nuances of language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Speaking with clarity and confidence thereby enhancing employability skills of the students

**Syllabus: English Language Communication Skills Lab shall have two parts:**

- a. **Computer Assisted Language Learning (CALL) Lab**
- b. **Interactive Communication Skills (ICS) Lab**

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

**Exercise – I**

**CALL Lab:** Introduction to Phonetics – Speech Sounds – Vowels and Consonants

**ICS Lab:** Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

**Exercise – II**

**CALL Lab:** Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

**ICS Lab:** Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt- confused/misused

**Exercise - III**

**CALL Lab:** Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

**ICS Lab:** Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

**Exercise – IV**

**CALL Lab:** Intonation and Common errors in Pronunciation.

**ICS Lab:** Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

**Exercise – V**

**CALL Lab:** Neutralization of Mother Tongue Influence and Conversation Practice

**ICS Lab:** Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

**Minimum Requirement of infra structural facilities for ELCS Lab:**

1. **Computer Assisted Language Learning (CALL) Lab:**  
**The Computer aided Language Lab** for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

**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

**2. Interactive Communication Skills (ICS) Lab :**

**The Interactive Communication Skills Lab:** A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

**Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):**

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories*. New Delhi: Foundation
2. **Strengthen Your Steps** - Dr. M. Hari Prasad and others, Maruthi Publications
3. *Speaking English Effectively* 2<sup>nd</sup> Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
4. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews*. Tata McGraw Hill
5. Hancock, M. 2009. *English Pronunciation in Use. Intermediate*. Cambridge: CUP
6. *Spoken English: A Manual of Speech and Phonetics* by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
7. Hewings, M. 2009. *English Pronunciation in Use. Advanced*. Cambridge: CUP
8. Marks, J. 2009. *English Pronunciation in Use. Elementary*. Cambridge: CUP
9. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication*. New Delhi : Foundation
10. Soundararaj, Francis. 2012. *Basics of Communication in English*. New Delhi: Macmillan
11. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
12. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
13. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan)
14. **Lab Manual:** A Manual entitled "*English Language Communication Skills (ELCS) Lab Manual- cum- Work Book*", published by Cengage Learning India Pvt. Ltd, New Delhi. 2013

**DISTRIBUTION AND WEIGHTAGE OF MARKS**

**English Language Laboratory Practical Examination:**

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-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 year- 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.