

ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

REGULATIONS 2013

II SEMESTER CURRICULUM

B.Tech. Pharmaceutical Technology

SEMESTER II

THEORY					
Course Code	Course Title	L	T	P	C
HS6251	Technical English - II	3	1	0	4
MA6251	Mathematics - II	3	1	0	4
PH6252	Physics of Materials	3	0	0	3
GE6253	Engineering Mechanics	3	1	0	4
BT6201	Biochemistry	3	0	0	3
PY6201	Fundamentals of Human Anatomy and Physiology	3	0	0	3
PRACTICAL					
Course Code	Course Title	L	T	P	C
BT6211	Biochemistry Laboratory	0	0	4	2
PY6212	Experimental Physiology Laboratory	0	0	4	2
TOTAL		18	3	8	25

II SEMESTER SYLLABI
B. TECH. PHARMACEUTICAL TECHNOLOGY

HS6251

TECHNICAL ENGLISH II

L T P C
3 1 0 4

OBJECTIVES:

- To make learners acquire listening and speaking skills in both formal and informal contexts.
- To help them develop their reading skills by familiarizing them with different types of reading strategies.
- To equip them with writing skills needed for academic as well as workplace contexts.
- To make them acquire language skills at their own pace by using e-materials and language lab components.

OUTCOMES:

Learners should be able to

- speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
- write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
- read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
- listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.

UNIT I

9 + 3

Listening - Listening to informal conversations and participating; Speaking - Opening a conversation (greetings, comments on topics like weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); Reading - Developing analytical skills, Deductive and inductive reasoning - Extensive reading; Writing - Effective use of SMS for sending short notes and messages - Using 'emoticons' as symbols in email messages; Grammar - Regular and irregular verbs - Active and passive voice; Vocabulary - Homonyms (e.g. 'can') - Homophones (e.g. 'some', 'sum'); E-materials - Interactive exercise on Grammar and vocabulary – blogging; Language Lab - Listening to different types of conversation and answering questions.

UNIT II

9 + 3

Listening - Listening to situation based dialogues; Speaking - Conversation practice in real life situations, asking for directions (using polite expressions), giving directions (using imperative sentences), Purchasing goods from a shop, Discussing various aspects of a film (they have already seen) or a book (they have already read); Reading - Reading a short story or an article from newspaper, Critical reading, Comprehension skills; Writing - Writing a review / summary of a story / article, Personal letter (Inviting your friend to a function, congratulating someone for his / her success, thanking one's friends / relatives); Grammar - modal verbs, Purpose expressions; Vocabulary - Phrasal verbs and their meanings, Using phrasal verbs in sentences; E-materials - Interactive exercises on Grammar and vocabulary, Extensive reading activity (reading stories / novels), Posting reviews in blogs - Language Lab - Dialogues (Fill up exercises), Recording students' dialogues.

UNIT III**9 + 3**

Listening - Listening to the conversation - Understanding the structure of conversations; Speaking - Conversation skills with a sense of stress, intonation, pronunciation and meaning - Seeking information – expressing feelings (affection, anger, regret, etc.); Reading - Speed reading – reading passages with time limit - Skimming; Writing - Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading articles from journals - Format for journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) - Writing strategies; Grammar - Conditional clauses - Cause and effect expressions; Vocabulary - Words used as nouns and verbs without any change in the spelling (e.g. 'rock', 'train', 'ring'); E-materials - Interactive exercise on Grammar and vocabulary - Speed Reading practice exercises; Language Lab - Intonation practice using EFLU and RIE materials – Attending a meeting and writing minutes.

UNIT IV**9 + 3**

Listening - Listening to a telephone conversation, Viewing model interviews (face-to-face, telephonic and video conferencing); Speaking - Role play practice in telephone skills - listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping interview skills; Reading - Reading the job advertisements and the profile of the company concerned – scanning; Writing - Applying for a job – cover letter - résumé preparation – vision, mission and goals of the candidate; Grammar - Numerical expressions - Connectives (discourse markers); Vocabulary - Idioms and their meanings – using idioms in sentences, E-materials - Interactive exercises on Grammar and Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; Language Lab - Telephonic interview – recording the responses - e-résumé writing.

UNIT V**9 + 3**

Listening - Viewing a model group discussion and reviewing the performance of each participant - Identifying the characteristics of a good listener; Speaking - Group discussion skills – initiating the discussion – exchanging suggestions and proposals – expressing dissent/agreement – assertiveness in expressing opinions – mind mapping technique; Reading - Note making skills – making notes from books, or any form of written materials - Intensive reading; Writing – Checklist - Types of reports – Feasibility / Project report – report format – recommendations / suggestions – interpretation of data (using charts for effective presentation); Grammar - Use of clauses; Vocabulary – Collocation; E-materials - Interactive grammar and vocabulary exercises - Sample GD - Pictures for discussion, Interactive grammar and vocabulary exercises; Language Lab - Different models of group discussion.

TOTAL: 60 PERIODS**TEXTBOOKS**

1. Department of English, Anna University. Mindscapes: English for Technologists and Engineers. Orient Blackswan, Chennai. 2012
2. Dhanavel, S.P. English and Communication Skills for Students of Science and Engineering. Orient Blackswan, Chennai. 2011

REFERENCES

1. Anderson, Paul V. Technical Communication: A Reader-Centered Approach. Cengage. New Delhi. 2008
2. Muralikrishna, & Sunita Mishra. Communication Skills for Engineers. Pearson, New Delhi. 2011
3. Riordan, Daniel. G. Technical Communication. Cengage Learning, New Delhi. 2005
4. Sharma, Sangeetha & Binod Mishra. Communication Skills for Engineers and Scientists. PHI Learning, New Delhi. 2009
5. Smith-Worthington, Darlene & Sue Jefferson. Technical Writing for Success. Cengage, Mason USA. 2007

EXTENSIVE Reading (Not for Examination)

1. Khera, Shiv. You can Win. Macmillan, Delhi. 1998.

WEBSITES

1. <http://www.englishclub.com>
2. <http://owl.english.purdue.edu>

TEACHING METHODS:

- Lectures
- Activities conducted individually, in pairs and in groups like individual writing and presentations, group discussions, interviews, reporting, etc
- Long presentations using visual aids
- Listening and viewing activities with follow up activities like discussions, filling up worksheets, writing exercises (using language lab wherever necessary/possible) etc
- Projects like group reports, mock interviews etc using a combination of two or more of the language skills

EVALUATION PATTERN:

Internal assessment: 20%

3 tests of which two are pen and paper tests and the other is a combination of different modes of assessment like

- Project
- Assignment
- Report
- Creative writing, etc.

All the four skills are to be tested with equal weightage given to each.

- ✓ Speaking assessment: Individual presentations, Group discussions
- ✓ Reading assessment: Reading passages with comprehension questions graded following Bloom's taxonomy
- ✓ Writing assessment: Writing essays, CVs, reports etc. Writing should include grammar and vocabulary.
- ✓ Listening/Viewing assessment: Lectures, dialogues, film clippings with questions on verbal as well as audio/visual content graded following Bloom's taxonomy.

End Semester Examination: 80%

OBJECTIVES:

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I VECTOR CALCULUS**9+3**

Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

UNIT II ORDINARY DIFFERENTIAL EQUATIONS**9+3**

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT III LAPLACE TRANSFORM**9+3**

Laplace transform – Sufficient condition for existence – Transform of elementary functions – Basic properties – Transforms of derivatives and integrals of functions - Derivatives and integrals of transforms - Transforms of unit step function and impulse functions – Transform of periodic functions. Inverse Laplace transform -Statement of Convolution theorem – Initial and final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

UNIT IV ANALYTIC FUNCTIONS**9+3**

Functions of a complex variable – Analytic functions: Necessary conditions – Cauchy-Riemann equations and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: $w = z+k$, kz , $1/z$, z^2 , e^z and bilinear transformation.

UNIT V COMPLEX INTEGRATION**9+3**

Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula – Taylor's and Laurent's series expansions – Singular points – Residues – Cauchy's residue theorem – Evaluation of real definite integrals as contour integrals around unit circle and semi-circle (excluding poles on the real axis).

TOTAL: 60 PERIODS**TEXT BOOKS:**

1. Bali N. P and Manish Goyal, "A Text book of Engineering Mathematics", Eighth Edition, Laxmi Publications Pvt Ltd.,(2011).
2. Grewal. B.S, "Higher Engineering Mathematics", 41st Edition, Khanna Publications, Delhi, (2011).

REFERENCES:

1. Dass, H.K., and Er. Rajnish Verma,” Higher Engineering Mathematics”, S. Chand Private Ltd., (2011)
2. Glyn James, “Advanced Modern Engineering Mathematics”, 3rd Edition, Pearson Education, (2012).
3. Peter V. O’Neil,” Advanced Engineering Mathematics”, 7th Edition, Cengage learning, (2012).
4. Ramana B.V, “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, New Delhi, (2008).

PH6252**PHYSICS OF MATERIALS****L T P C**
3 0 0 3**UNIT I PREPARATION AND PROCESSING OF MATERIALS**

Phases - Phase rule – binary systems – tie line rule – lever rule – phase diagram – invariant reactions – diffusion Fick’s law - Nucleation – homogeneous and heterogeneous nucleation – Free energy of formation of a critical nucleus – crystal growth – Czochralski, Bridgman, Solution methods - Thin films – preparation: PVD method - Sol-gel method – heat treatment and hardening processes..

UNIT II PROPERTIES OF CONDUCTING AND SUPER CONDUCTING MATERIALS**9**

Classical free electron theory of metals –Fermi function - Schrödinger wave equation - Time independent and time dependent equations. Physical significance of wave function, particle in a box (in one dimension) – electrons in a metal - Density of energy states – effect of temperature on Fermi energy – carrier concentration in metals - Superconducting Phenomena, Properties of superconductors – Meissner effect and Isotope effect. Type I and Type II superconductors, High T_c superconductors – Magnetic levitation and SQUIDS.

UNIT III ELECTRONIC MATERIALS**9**

Elemental and compound semiconductors - Origin of band gap in solids (qualitative) - Concept of effective mass of electron and hole – carrier concentration in an intrinsic semiconductor (derivation) – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – carrier concentration in n-type and p-type semiconductors (derivation) – variation of Fermi level with temperature and impurity concentration – Compound semiconductors – Hall effect – Determination of Hall coefficient – LED and Solar cells.

UNIT IV INSULATING AND MAGNETIC MATERIALS**9**

Dielectric, paraelectric and ferroelectric materials - Electronic, Ionic, Orientational and space charge polarization – Internal field and deduction of Clausius Mosotti equation – dielectric loss – different types of dielectric breakdown – classification of insulating materials and their applications - Introduction to magnetic materials - Domain theory of ferromagnetism, Hysteresis, Soft and Hard magnetic materials – Anti-ferromagnetic materials – Ferrites, Giant Magneto Resistance materials. Magnetic bubbles.

UNIT V CERAMIC AND NEW MATERIALS**9**

Introduction to Ceramics and its applications - Ceramic Fibres - Fibre reinforced Plastics – Fibre reinforced Metal – Metallic glasses – Shape memory alloys – Copper base alloys – Nickel – Titanium alloys – Relaxor- Ferroelectric materials – Electro and magneto rheological fluids - Sensors and Actuators – polymer semiconductors – photoconducting polymers – liquid crystals - Bio-sensors - Scintillation detectors (Position sensitive) –Bio materials – hydroxyapatite – PMMA – Silicone.

TOTAL : 45 PERIODS**REFERENCES**

1. Raghavan. V. Materials Science and Engineering, Prentice Hall of India, 2002.
2. Kumar.J, Moorthy Babu. S and Vasudevan. S., Engineering Physics, Vijay Nicole Imprints, 2006
3. Palanisamy.. P.K., Materials Science, Scitech., 2003.
4. Calister, W.D., Materials Science and Engineering an Introduction, John Wiley, 2003.
5. Raghavan, V., Physical Metallurgy, Prentice Hall of India, 2002.

BT6201**BIOCHEMISTRY****L T P C**
3 0 0 3**OBJECTIVES**

- To develop understanding and provide scientific basics of the life processes at the molecular level and explain the structure, function and inter-relationships of bio-molecules and their deviation from normal and their consequences for interpreting and solving clinical problems.

UNIT I BIOCHEMICAL ORGANIZATION AND BIOENERGETICS**10**

Scope of clinical biochemistry, component of the cell, structure and biochemical functions, membrane structure and functions, transport through biological cell membrane, the concept of free energy, determination of change in free energy from equilibrium constant and reduction potential, bioenergetics and biological oxidation – general concept of oxidation and reduction, electron transport chain, oxidative phosphorylation, uncouplers and theories of biological oxidation and oxidative phosphorylation

UNIT II BIOMOLECULES**12**

Carbohydrates – classification, properties. starch, glycogen, dextrin, inulin, cellulose, metabolism of carbohydrates – gluconeogenesis, glycogenolysis, glycolysis. citric acid cycle and its biological significance, role of sugar in nucleotide biosynthesis and pentose phosphate pathway. **Lipids** – Classification, properties. sterols, essential fatty acids, eicosanoids, phospholipids, sphingolipids, metabolism of lipids, oxidation of fatty acids, α, β - oxidation and biosynthesis of ketone bodies, cholesterol, porphyrin biosynthesis, metabolism of bile pigments. **Proteins and amino acids** – Classification, properties, biosynthesis of amino acids and proteins, essential amino acids, metabolism of amino acids and proteins, Nitrogen balance. **Nucleic acids** –genetic code, nucleic acids, and structure of DNA and RNA, purine biosynthesis and pyrimidine biosynthesis.

UNIT III BIOENERGETICS**5**

High energy compounds, electronegative potential of compounds , respiratory chain, ATP cycle , Calculation of ATP during oxidation of glucose and fatty acids.

UNIT IV MACROMOLECULES, VITAMINS, HORMONES, ENZYMES 10

Physical and chemical properties, structure of haemoglobin, immunoglobulins and nucleoprotein, classification and their properties, occurrence, functions, requirements, deficiency manifestations and role of vitamins as coenzyme, chemical nature and properties, hormones, Nomenclature, enzyme kinetics, classification and their properties, mechanism of action, enzyme induction and inhibition, coenzyme significance and enzymes of clinical importance

UNIT V BIOCHEMISTRY OF CLINICAL DISEASES 8

Diabetes mellitus, atherosclerosis, fatty liver, and obesity, hormonal disorders, aging, inborn errors of metabolism organ function tests

TOTAL: 45 PERIODS

TEXTBOOKS

1. Lehninger A.L., Nelson D.L. and Cox M.M. Principles of Biochemistry. CBS publishers and distributors
2. Murray R.K., Granner D.K., Mayes P.A. and Rodwell V.W. Harpers Biochemistry. Appleton and Lange ,Stanford ,Conneticut.
3. Thomas M. Devlin.Textbook of Biochemistry with clinical correlations. Wiley Liss Publishers

REFERENCES

1. Burtis & Ashwood W.B. Tietz Textbook of Clinical chemistry. Saunders Company
2. Lubert Stryer W.H. Biochemistry. Freeman and company, New york.
3. Donald Voet & Judith G. Voet. Biochemistry. John Wiley and Sons ,inc.
4. Rama Rao Textbook of Biochemistry.
5. Deb. Textbook of Biochemistry.

GE6253

ENGINEERING MECHANICS

**L T P C
3 1 0 4**

OBJECTIVES

- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering

UNIT I BASICS AND STATICS OF PARTICLES 12

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces — Vectorial representation of forces – Vector operations of forces -additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility .

UNIT II EQUILIBRIUM OF RIGID BODIES 12

Free body diagram – Types of supports –Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions

UNIT III PROPERTIES OF SURFACES AND SOLIDS 12

Centroids and centre of mass– Centroids of lines and areas - Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula –Theorems of Pappus - Area moments of inertia of plane areas – Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem –Principal moments of inertia of plane areas – Principal axes of inertia-Mass moment of inertia –mass moment of inertia for prismatic, cylindrical and spherical solids from first principle – Relation to area moments of inertia.

UNIT IV DYNAMICS OF PARTICLES 12

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion -Newton’s laws of motion – Work Energy Equation– Impulse and Momentum – Impact of elastic bodies.

UNIT V FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS 12

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction –wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder, disc/wheel and sphere.

TOTAL: 60 PERIODS

TEXT BOOKS:

1. Beer, F.P and Johnston Jr. E.R., “Vector Mechanics for Engineers (In SI Units): Statics and Dynamics”, 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004).
2. Vela Murali, “Engineering Mechanics”, Oxford University Press (2010)

REFERENCES:

1. Hibbeler, R.C and Ashok Gupta, “Engineering Mechanics: Statics and Dynamics”, 11th Edition, Pearson Education (2010).
2. Irving H. Shames and Krishna Mohana Rao. G., “Engineering Mechanics – Statics and Dynamics”, 4th Edition, Pearson Education (2006)
3. Meriam J.L. and Kraige L.G., “ Engineering Mechanics- Statics - Volume 1, Dynamics- Volume 2”, Third Edition, John Wiley & Sons,(1993)
4. Rajasekaran S and Sankarasubramanian G., “Engineering Mechanics Statics and Dynamics”, 3rd Edition, Vikas Publishing House Pvt. Ltd., (2005).
5. Bhavikatti, S.S and Rajashekarappa, K.G., “Engineering Mechanics”, New Age International (P) Limited Publishers, (1998).
6. Kumar, K.L., “Engineering Mechanics”, 3rd Revised Edition, Tata McGraw-Hill Publishing company, New Delhi (2008)

PY6201 FUNDAMENTALS OF HUMAN ANATOMY AND PHYSIOLOGY L T P C
3 0 0 3

OBJECTIVES

- To develop understanding about the structure (gross and histology) and functions of various organs of the human body; describe the various homeostatic mechanisms and their imbalances of various systems; identify the various tissues and organs of the different systems of the human body and appreciate coordinated working pattern of different organs of each system

UNIT I FOUNDATIONS OF PHYSIOLOGY, HOMEOSTASIS 7

Organization of the Human Body , Chemical Foundations – Atoms, Ions, Molecules, Bonds, Solutions, Classes of organic molecules; Physical Foundations – Morphology of the cell (plasma membrane, nucleus, cell organelles) Elementary tissues of the human body: epithelial, connective, Muscular and nervous tissues-their sub-types and characteristics, Cellular Transport – Intracellular movement, Intercellular movement, Movement of molecules across the plasma membrane, intercellular communication.

UNIT II NERVOUS AND MUSCULO-SKELETON SYSTEM 12

Anatomy and physiology of brain, blood-brain barrier, spinal cord, structure and types of the neuron, synapses neurotransmitters, organization of spinal and cranial nerves, central and peripheral nervous system, autonomic nervous system, receptors membrane potentials – graded potentials and action potentials, physiology of vision, audition, olfaction, taste and skin; anatomy and physiology of muscular system, types of muscle tissue – skeletal, smooth, cardiac, contraction, muscle fibre regulation, Osseous system - structure, composition and functions of the Skeleton, classification of joints, types of movements of joints and their disorders

UNIT III GASTROINTESTINAL AND RENAL SYSTEM 7

Anatomy and physiology of the gastrointestinal tract (secretion, motility, digestion and absorption), structure and function of the liver, spleen, gall bladder, pancreas; the renal system structure – Anatomy and physiology kidney; structure of the nephron and network of blood capillaries urinary tract, formation of urine, concentration of urine; regulation of acid-base balance; the chemical acid-base buffer systems of body fluids and disease conditions

UNIT IV CARDIOVASCULAR AND PULMONARY SYSTEM 9

Anatomy and physiology of the heart, lungs, cardiac cycle, circulation of blood, heart rate, blood pressure, ECG and heart sounds, lymphatic vessel, systemic and portal circulation; vascular system – arteries, arterioles, capillaries, venules. Anatomy of respiratory tract, mechanism and dynamics of respiration, lung volumes, transport of oxygen and carbon dioxide, disorders like cyanosis

UNIT V ENDOCRINE AND REPRODUCTIVE SYSTEM 10

Anatomy and physiology of Pituitary, thyroid, parathyroid, adrenal and pancreatic hormones and disorders of these glands, endocrine control of growth and metabolism; pineal, thymus, testes, ovaries, structure and physiology of reproductive systems, sex hormones, physiology of fertilization, menstruation, menopause, spermatogenesis and oogenesis, pregnancy and parturition and clinical disorders

TOTAL : 45 PERIODS

TEXT BOOKS

1. Guyton, A.C. and Hall, J.E., "Textbook of Medical Physiology", 11th Edition, Saunders, 2006.
2. Ganong, W.F., "Review of Medical Physiology", 22nd Edition (A Lange Medical book series) McGraw – Hill (International Ed.) 2005.
3. Khurana, Indu, "A Textbook of Medical Physiology" Elsevier, 2006.
4. Johnson, L.R., "Essential Medical Physiology", 3rd Edition, Academic Press / Elsevier), 2003.

REFERENCES

1. Waugh, Anne and Allison Grant, "Ross and Wilson Anatomy and Physiology in Health and Illness", 10th Edition, Churchill – Livingstone / Elsevier), 2006.
2. Carola, R., Harley J.P. and Noback C.R., "Human Anatomy & Physiology", 2nd Edition, McGraw – Hill, 1992.
3. Vander, A.J., Sherman J.H. and Luciano D.S., "Human Physiology: The Mechanisms of Body Function", 5th Edition, McGraw – Hill, 1990.

OBJECTIVES

- To learn and understand the principles behind the qualitative and quantitative estimation of biomolecules (proteins, carbohydrates, lipids, metabolites etc.) and laboratory analysis of the same in the body fluids.

EXPERIMENTS

- Preparation and measurement of pH of standard buffers (phosphate, carbonate, borate, TRIS etc.).
- Qualitative analysis of carbohydrates (monosaccharides, disaccharides, polysaccharides etc.)
- Enzymatic hydrolysis of glycogen by α and β amylase
- Qualitative analysis of proteins
- Qualitative analysis of lipids (triglycerides, cholesterol, phospholipids etc.)
- Quantitative analysis of proteins (Lowry's method, Bradford, UV)
- Quantitative analysis of carbohydrates (Benedict's method etc.) lipids
- Quantitative analysis of lipids (Benedict's method etc.)
- Quantitative estimation of blood glucose
- Acid hydrolysis and action of salivary amylase on starch
- Estimation of chloride, glucose, ammonia and creatinine in urine.
- Quantitative analysis of urea in serum
- Quantitative analysis of serum bilirubin
- Quantitative estimation of serum cholesterol by Libermann Burchard's method
- Isolation and assay of glycogen from the liver and skeletal muscle of mice

TOTAL : 60 PERIODS**Equipment Required**

- UV-Visible Spectrophotometers
- pH meter
- Centrifuge

TEXT BOOKS

- Gupta R.C. and Bhargavan S. Practical Biochemistry.
- David T. Phummer. Introduction of Practical Biochemistry (II Edition).

REFERENCES

- Murray R.K., Granner D.K., Mayes P.A. and Rodwell V.W. Harpers Biochemistry, Appleton and Lange, Stanford, Connecticut.
- Thomas M. Devlin. Textbook of Biochemistry with clinical correlations. Wiley Liss Publishers

OBJECTIVES

- To learn the gross histology, structure and functions of various organs of the human body and perform the physiological tests and appreciate the interlinked mechanisms in the maintenance of normal functioning of human body

EXPERIMENTS

1. Study of different systems with the help of models (axial skeleton, appendicular skeleton, cardiovascular system, respiratory system, digestive system, urinary system, nervous system, special senses, reproductive system)
2. Principles of mounting tissue, examination, preservation,
3. Microscopic study of different tissues, epithelial, muscular, connective tissue, nervous tissue
4. Determination of bleeding and clotting time
5. Determination of R.B.C. count of blood
6. Estimation of Haemoglobin
7. Enumeration of W.B.C. count of blood
8. Determination of differential count of blood
9. Determination of Erythrocyte Sedimentation Rate
10. Blood group determination
11. Heart rate and blood pressure recording
12. Identification of human bones and joints, anatomic features
13. Determination of vital capacity

TOTAL : 60 PERIODS

Equipment Required :

1. Microscope
2. Pippete aids
3. Haemocytometer
4. B.P.meter

TEXT BOOKS

1. Goyal R. K., Natvar M.P, and Shah S.A, Practical anatomy, physiology and biochemistry, latest edition, Publisher: B.S Shah Prakashan, Ahmedabad.
2. Tortora Gerard J. and Nicholas P. Principles of anatomy and physiology Publisher Harpercollins college New York.

REFERENCES

1. Ranade V.G. Text book of practical physiology, Latest edition, Publisher: PVG, Pune
2. Anderson Experimental Physiology, Latest edition, Publisher: NA
3. Best and Taylor's "Physiological basis of Medical Practice".
4. Guyton A.C. Hall J.E. Text book of Medical Physiology.
5. Chatterjee C.C.. Human Physiology.
6. Cynn A. Keek, Eric Neil and Norman Joels. Samson Wright's Applied Physiology.
6. Park J.E. and Park K. Textbook of Preventive and Social Medicine.