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VTU AICTE Model Curriculum TEQIP 1.3 Workshop proceedings

veenas more <veenasmore@sapthagiri.edu.in>
To: "Gopinath S.M." <gopinath@acharya.ac.in>

Wed, May 8, 2019 at 7:34 AM

Respected Sir,
As per the discussions held during the BOS meeting held on 02-05-2019 & 03-05-2019 in MSRIT, I was assigned to frame the syllabus for Introduction to Biomolecules, Human Physiology and addition of 4 extra experiments to Biochemistry Laboratory..PFA documents for the same.

Regards,
Dr.Veena S. More
[Quoted text hidden]

3 attachments

- 18BT34-Introduction to biomolecules.doc 100K
- 18BT643-Human Physiology.doc 74K
- 18BTL47-Biochemistry Laboratory.doc 64K

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AICTE Model Curriculum TEQIP 1.3 Workshop Circular 256, 371 and 372

1 message

VTU Academic <academic.vtu@gmail.com> Wed, Apr 24, 2019 at 5:45 PM
To: veenasmore@sapthagiri.edu.in, swamyber@hotmail.com, pruthvishr@acharya.ac.in

Please find attached herewith AICTE Model Curriculum TEQIP 1.3 Workshop Circular 256, 371 and 372, for your information.

As per the request of the Chairman, BOS in Biotechnology, you are invited to attend the workshop as per the schedule along with the Chairman, BOS in Biotechnology.

TA/DA will be paid by the University for attending the workshop as per VTU Norms

Academic Section
Visvesvaraya Technological University
Jnana Sangama
Belagavi - 590018
Ph: 91-831-2498100

3 attachments

- AICTE Model Curriculum TEQIP 1.3 Workshop Circular 256.pdf 86K
- AICTE Model Curriculum TEQIP 1.3 Workshop Circular 371.pdf 63K
- AICTE Model Curriculum TEQIP 1.3 Workshop Circular 372.pdf 69K

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Introduction to Biomolecules

[As per Choice Based Credit System (CBCS) scheme]
SEMESTER – III

Sub. Code :	18BT34	CIE Marks :	40
Hours/week(L:T:P) :	(3+0 +0)	Exam Hrs. :	3
Total Hours :	40	SEE Marks :	60

CREDITS –

Course objectives: This course will enable students to learn

- the basic structure ,organization ,scope and function of Biomolecules
- the transformation of energy within the living organisms
- the composition, structure and function of biological membranes
- the types and functions of transport system

New paper introduced.

MODULES	TEACHING HOURS	REVISED BLOOM'S TAXONOMY (RBT) LEVEL
MODULE – 1		
Carbohydrates: Introduction, sources, classification into mono, oligo and polysachcharides. Classification of monosachcharides, based on no. of C-atoms. Functional groups- aldoses and ketoses(stressing the difference between reducing and non-reducing sugars). Isomerism of Carbohydrates, Fischer projections, Haworth structures, pyranose and furanose structures, Anomers, Chair and boat conformations. Structure and properties of oligosachcharides and polysachcharides **Lipids:** Introduction,sources,Nomenclature,Important saturated & unsaturated fatty acids. Properties & functions.Derived lipids: Phospholipids,glycolipids,Waxes,Steroids-Structure of steroid nucleus, Biological role of cholosterol	**08**	L1,L2
MODULE –2		
Amino acid and Protens: Introduction, classification,optical isomerism, chemical properties,Acid –Base properties, polyionic nature ,zwitter ions, pKa, pI .Peptide bond formation and properties. Composition and primary structures of proteins Conformational analysis and forces that determine protein structures, geometries, phi, psi, omega angles, Ramachandran or steric contour diagram, allowed chi angles of side chains in proteins, hydrogen bonding, disulphide bonds, hydrophobic interactions, vanderwaals forces, , alpha helices, beta sheets, helix to coil transition, general features and thermodynamic aspects of protein folding, Relationship between the primary, secondary,	08	L1,L2

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and tertiary structure of proteins. Structure of fibrous proteins (structure of collagen, keratin). Quaternary structures - dimers, homo &hetero dimers, trimers, tetramers; Protein folds, structural families and classes, multifunctional domains		
MODULE – 3		
Nucleic acids: Structures of purine and pyrimidine bases, nucleosides, nucleotides,RNA and DNA (differences) forces and stabilizing geometries, glycosidic bond, rotational isomers. Stabilizing ordered forms of DNA (A, Band Z), base pairing types, base stacking, tertiary structure of DNA (Supercoiled DNA), Melting of the DNA double helix (Hyperchromicity), Interaction with small ions and small molecules. Ribose puckering and Types of RNA-m RNA ,r RNA & t RNA (secondary & tertiary structure of tRNA.)	08	L1,L2
MODULE – 4		
Bioenergetics: Energy, Energy flow cycle, energy conversion, Structure and properties of ATP, High energy compounds, Thermodynamic considerations, coupling reactions of ATP & NDP(Nucleotide di phosphate),Photosynthesis, light reactions, dark reaction, ancillary pigments, PS I & II	08	L1,L2,L4
MODULE – 5		
Biological membranes and Transport Mechanism: Biological membranes: structure, permeability, properties, passive transport and active transport, facilitated transport, energy requirement, mechanism of Na+ /K+, glucose and amino acid transport. Organization of transport activity in cell. Action Potentials. Role of transport in signal transduction processes.	08	L1,L2,L3

Course outcomes:
After studying this course, students will be able to:

COs	Description	Blooms Taxonomy level
CO1	Present the foundational principles of macromolecular structure and function	L1,L2
CO2	Understand and analyze high energy molecules and Photosynthesis	L1,L2,L4
CO3	Understand about biological membrane and transport mechanism across the cell membrane and analyse its regulation	L1,L2,L3

Graduate Attributes (as per NBA):

- Lifelong learning.
- Problem Analysis
-

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Question paper pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 60
- The question paper will have ten questions.
- Each full question consists of 20 marks.
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Principles of Biochemistry by Albert Lehninger, CBS publishers.
2. Biochemistry by Nelson and Cox, Palgrave Macmilan, Freeman Edn.
3. Principles of Biochemistry by Lubert Stryer, Freeman Int. Edition
4. Biophysical Chemistry by Cantor R. and Schimmel P.R, W. H. Freeman.
5. Physical Biochemistry by David Freifelder, W H Freeman and Company.3. Biophysical
6. Principles of Structure & Function by Fred M. Snell & Sidney Shulman
7. Introduction to Protein Structure by Carl Branden and John Tooze, Garland Publishing.
8. Proteins Structure – A Practical Approach by Creighton, Oxford University Press.
9. Physical Chemistry: Principles and Applications in Biological Sciences by Tinoco and others, Prentice Hall
10. Bioenergetics and its thermodynamics foundations by Lars Garby and Poul S Larsen, Cambridge University Press.

REFERENCE BOOKS

1. Biochemistry by Voet &Voet, Wiley New York.
2. Biochemistry by Trehan. K, New Age International.
3. Biophysics – An Introduction by Cotterill, Wiley Student Edition.
4. Foundations of Biophysics by A.L. Stanford, Academic Press.
5. Principles of protein structure by G Schulz and R H Schrimer, Springer Verlag.
6. Principles of nucleic acid structure by Sanger, Springer Verlag.
7. Introduction to Protein Science by Arthur M Lesk, Oxford University Press
8. Biochemistry by U Sathyanarayana, Books & Allied Publishers.
9. Biochemistry & Molecular Biology y Elliott & Elliott, Oxford Press Publishers, 4th Edition

Human Physiology

[As per Choice Based Credit System (CBCS) scheme]
SEMESTER – III

Sub. Code :	18BT643	CIE Marks :	40
Hours/week(L:T:P) :	(3+0 +0)	Exam Hrs. :	3
Total Hours :	40	SEE Marks :	60

CREDITS –

Course objectives: This course will enable students to learn

- the structure ,organization and function of tissues and skeletal & muscular system
- the major organs and their functions of the digestive and excretory systems
- the major organs and components of the nervous system and understand their functions
- the major organs and components of the respiratory and circulator system and understand their functions
- the major endocrine glands and explain the interrelationships between endocrine glands.

New paper Introduced.

MODULES	TEACHING HOURS	REVISED BLOOM'S TAXONOMY (RBT) LEVEL
MODULE – 1		
Tissues: Epithelial tissue, Connective tissues (Blood, Bones, cartilages), Muscular tissues, Nervous tissue, **Skeletal & Muscular system**: Cartilage and bone; Comparison between cartilage and bone; Functions of skeletal system; Joints; Muscles of limb movement. Principal types of muscles; General properties of muscles; Mechanism of muscle contraction and relaxation, Red and white muscle fibers.	**08**	L1,L2
MODULE –2		
Digestive system : Overview of digestive system, functional anatomy of digestive system: mouth, pharynx, esophagus, the stomach the small and large intestine. Digestive glands, Enzymes; Physiology of Digestion and Absorption. **Excretory system:** Methods of excretion; Physiological processes involved in excretion; Kidneys; Anatomy and physiology, Nephron and its structure. Functions of nephron; Nephron physiology and mechanism of urine formation; Regulation of urine formation; Osmoregulation by kidney	08	L1,L2, L4
MODULE – 3		

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Respiratory system: Introduction; structure of respiratory organs; Mechanism of breathing; pulmonary air volumes, Gas exchange in the lungs. Kinds of respiration; Transport of respiratory gases in the blood **Circulatory system**: Structure, Composition and functions of blood. Blood Groups and Rh factor. Blood clotting mechanism, Basic anatomy of the heart, Physiology of heart, blood vessels and circulation. Basic understanding of Cardiac cycle, electrocardiogram. Blood pressure and its regulation. Brief outline of cardiovascular disorder like hypertension, hypotension, arteriosclerosis, angina, myocardial infarction, congestive heart failure and cardiac arrhythmias	08	L1,L2, L4
MODULE – 4		
Nervous system: Introduction; Role of nervous system; Types of neurons. Types of glial cells and its function. Main properties of nervous tissue Mode of action of nerves; Conduction of nerve impulses; Central nervous system; The brain; The spinal cord; Peripheral nervous system	08	L1,L2, L4
MODULE – 5		
Endocrine system: Introduction; Endocrine systems of vertebrates; Pituitary gland; Thyroid gland; Parathyroid gland; Pancreas; Adrenal or suprarenal glands; Sex glands; Gastrointestinal mucosa; Thymus gland; Pineal gland; Summary of different endocrine glands; their hormones and influence; Summary of the effect of hyper secretion and hyposecretion of some important endocrine glands;	08	L1,L2,L4

Course outcomes:
After studying this course, students will be able to:

COs	Description	Blooms Taxonomy level
CO1	understand the anatomy and physiology relationship of the various tissues in the human body	L1,L2
CO2	Identify the major organs and components of different systems and understand their functions and regulations.	L1,L2,L4

Graduate Attributes (as per NBA):

- Lifelong learning.
-
-

Question paper pattern:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 60
- The question paper will have ten questions.
- Each full question consists of 20 marks.
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Textbook of Medical Physiology – Guyton and Hall. Elsevier, Saunders College Publishing
2. Waugh A & Grant A (2014), Ross & Wilson's Anatomy and Physiology in Health and Illness, 12th Edn., Churchill Livingstone Publications, USA.
3. Lauralee Sherwood (2012), Fundamentals of Human Physiology, 4th Edn., Brooks/Cole, Belmont, CA
4. Sembulingam K & Prema S (2012), Essentials of Medical Physiology, 6th Edn., Jaypee Publications, Delhi, India.

REFERENCE BOOKS

1. 1. Daniel DC (2011), Human Biology, 7th Edn., Jones and Barlette Publishers Pvt. Ltd., USA.
2. Channarayappa (2010) Cell Biology: Universities Press (India) Pvt Ltd.
3. Laurie Kelly Mccorry (2008), Essentials of human physiology for pharmacy, 2nd Edn., CRC Press, Boca Raton, FL.
4. Sujit K Chaudhari, (2003), Concise Medical Physiology, 5th Edn., New Central Book Agency Pvt. Ltd., Delhi, India.

TITLE OF THE COURSE: BIOCHEMISTRY LABORATORY

B.E., IV Semester, Biotechnology

[As per Choice Based Credit System (CBCS) scheme]

Course Code	18BTL47	CIE Marks	40
Number of Lecture Hours/week	03= (1 Hour Instruction + 2 Hours Laboratory)	SEE Marks	60
Total Number of Hours	40	Exam Hours	03
RBT Levels		L1, L2, L3, L4,L5	

CREDITS – 02

Course objectives:

This laboratory course will enable students:

- To know the basic laboratory mathematics.
- To analyze the concentration of unknown sample and interpret the results.
- To acquire means to manage experiments independently.

Experiments:

1. pH measurements, volume / weight measurements, concentration units, sensitivity. Specificity, precision, accuracy, preparation of buffers of constant strength.
2. Titration of amino acids with acids & bases.
3. Qualitative tests for carbohydrate and lipids.
4. Qualitative tests for amino acids and proteins.
5. Estimation of blood sugar by Folin method and by O-toluene method.
6. Estimation of inorganic phosphate by Fiske-Subbarao method.
7. Estimation of amino acid by Ninhydrin method.
8. Estimation of total cholesterol from Serum.
9. Determination of saponification value and iodine value of lipids with error analysis.
10. Determination of acetyl value of a lipid with error analysis.
11. Estimation of urea by diacetyl monooxime method with error analysis.
12. Estimation of iron from hemoglobin with error analysis.
13. Estimation of Vitamin C by titrimetric method
14. Estmation of lactose in milk by DNS method
15. Estimation of uric acid in blood by Caraway's method
16. Estimation of creatinine in serum and urine by Jaffe's method

Course outcomes:

On the completion of this laboratory course, the students will be able to:

- Demonstrate the basic laboratory mathematics necessary to perform tests, make dilutions, and prepare buffer solutions.
- Compare/contrast Qualitative and quantitative analysis of various Biomolecules.

Conduct of Practical Examination:

- All laboratory experiments are to be included for practical examination.
- Students are allowed to pick one experiment from the lot.
- Strictly follow the instructions as printed on the cover page of answer script for breakup of marks.
- Change of experiment is allowed only once and 15% Marks allotted to the procedure part to be

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made zero.

Reference Books:

1. Modern Experimental Biochemistry by Rodney Boyer, Pearson Education.
2. Practical Biochemistry by Cole, Cambridge University Press.
3. Practical Biochemistry by Keith Wilson, Cambridge University Press.
4. An introduction to practical biochemistry by Plummer, Tata McGraw Hill.
5. Experimental Biochemistry by Beedu Sashidhar Rao and Vijay Deshpande, I.K.Intl.
6. Lab Math by Dany Spencer Adams, IK Intl. Pub. House.
7. Lab Ref by Jaine Roskams & Linda Rodgers, IK Intl. Pub. House.
8. Manual of Practical Biochemistry for medical students, 2nd edition, University Press.

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