



Course Outline Form

ODD SEMESTER 2019

Dear Student: Course outlines are intended to provide students with an overall plan for a course to enable them to function efficiently and effectively in the course.

*Academic Programs
BSc Biochemistry
EMEA College
Kondotty*

Course Outline : Techniques in Biochemistry (2018-2019)

Name of the Stream	Science
Name of the Programme	BSc Biochemistry
Name of the Course	Techniques in Biochemistry
Nature of the Course	Core Course
Semester	Third
Lecturer(s)	Sulfikar Ali M
Name of the Coordinator	
Year	2018-2019
No of Credits	3
No of Contact Hours	54
Course Description	An introduction to techniques used in biochemical and biotechnology research, including measurement of pH, spectroscopy, analysis of enzymes, chromatography, fractionation of macromolecules, electrophoresis and centrifugation.
Course Objectives	This course will introduce some of the experimental techniques used in biochemistry and molecular biology. These include methods for purifying proteins, analyzing biological molecules by electrophoresis and centrifugation . Understanding the principle and instrumentation of spectrophotometry and colorimetry .Basic idea about RIA and GM counter
Course Outcome	<ul style="list-style-type: none"> • Develop competence in handling various chromatographic techniques and apply them in isolating and characterizing different biological molecules. • Understanding the applications of centrifugation and chromatography in biological investigations. • Understanding the principle and applications of RIA and GM counter • Understanding the principles of Electrophoresis, Spectrophotometry and ELISA and their applications in biological investigations/experiments.
Assessment Method	Assignments Homeworks Class Tests Unit Tests Practical Tests Term Exam Seminars Lab Experiments

Teaching Methods Used	<p>Lectures</p> <p>Cooperative Learning</p> <p>Collaborative Learning</p> <p>LMS</p> <p>Class Discussion</p> <p>Seminars</p> <p>Project Presentations</p> <p>Tutorials</p> <p>Powerpoint Slides</p>
Textbook	<p>1. Physical Biochemistry- Application to Biochemistry and Molecular Biology: Friefelder D. WH Freeman and Company</p> <p>1. Principles and Techniques of Biochemistry and Molecular Biology: - Ed. K. Wilson and J. Walker, Cambridge University Press.</p> <p>2. The Tools of Biochemistry: Cooper T.G., John Wiley and Sons Publication.</p> <p>3. Biophysical chemistry. Principles and Techniques: Upadhayay A, Upadhayay K and Nath N., Himalaya publishing house.</p>
References	<p>1. Physical Biochemistry- Application to Biochemistry and Molecular Biology: Friefelder D. WH Freeman and Company</p> <p>1. Principles and Techniques of Biochemistry and Molecular Biology: - Ed. K. Wilson and J. Walker, Cambridge University Press.</p> <p>2. The Tools of Biochemistry: Cooper T.G., John Wiley and Sons Publication.</p> <p>3. Biophysical chemistry. Principles and Techniques: Upadhayay A, Upadhayay K and Nath N., Himalaya publishing house.</p> <p>4. Experimental Biochemistry. Cark Jr J. M. and Switzer R.L , W.H. Freeman and Company.</p> <p>5. Research Methodology for Biological Sciences: Gurumani.N , M.J.P. Publishers., Chennai, India.</p> <p>6. Instrumental Methods of Chemical Analysis: Chatwal. G and Anand.S., Himalaya Publishing House, Mumbai, India.</p> <p>7. A Biologist's Guide to Principles and Techniques of Practical Biochemistry: Williams. B.L. and Wilson. K. (ed.) Edward Arnold Ltd. London</p>
Internet Resources	<p>http://www.biology.arizona.edu/biochemistry/biochemistry.html</p> <p>http://www.musc.edu/chp-clin/ect/acidbase/abwk1ho.htm</p> <p>Exercise and buffers: http://www.chemistry.wustl.edu/EduDev/LabTutorials/Buffer/Buffer.html</p> <p>http://web.indstate.edu:80/thcme/mwking</p> <p>http://cti.itc.virginia.edu/~cmg/</p> <p>http://www.gwu.edu/~mpb/index.html</p> <p>http://www.stark.kent.edu/~cearley/pchem/AAcids/titrate.htm</p> <p>http://www.stark.kent.edu/~cearley/pchem/pchem.htm</p> <p>http://www.cryst.bbk.ac.uk/PPS2/course/section3</p> <p>http://www.cryst.bbk.ac.uk/PPS2/top.html</p> <p>http://www.biology.arizona.edu/biochemistry/biochemistry.html</p>

Internal Exam Pattern

Items	Marks/20	Marks/15
Assignment	4	3
Test Paper(s)/Viva voce	8	6
Seminar/Presentation	4	3
Class Room Participation based on Attendance	4	3
Total	20	15

External Exam Pattern

Question Type	No of Question	Marks/Question	Total Marks
Short Questions(2-3 Sentences)	15	2	Ceiling 25
Paragraph / Problem Type	8	5	Ceiling 35
Essay Type	2 out of 4	10	20
Total			80
Time			2.5 hrs

Graduate Attributes	<p>Name of the Course: Techniques in Biochemistry</p> <p>Knowledge</p> <p>Academic and Intellectual Skills</p> <p>Self Learning</p> <p>Collaborative Learning</p> <p>Professional Skills</p> <p>Communication Skills</p> <p>Team Work and Leadership</p> <p>Critical and Analytical Skills</p> <p>Cross Cultural Skills</p> <p>Problem Solving Skills</p> <p>Research Skills</p> <p>Personal Skills</p> <p>Creative Thinking</p> <p>Application Skills</p> <p>Life Skills</p> <p>Attitude and Values</p> <p>Social Responsibility</p> <p>Ethical Commitment</p> <p>Nation Building</p>
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Course Schedule

Methods of tissue homogenization. Salt and organic solvent extraction and fractionation. Dialysis, Reverse dialysis, ultra filtration, lyophilization.	Week 1 Week 2
Chromatography:- principle, procedure and application of partition chromatography , adsorption chromatography, ion exchange chromatography, gel chromatography, affinity chromatography, Paper , TLC, HTPLC, GLC and HPLC.	Week 3 Week 4 Week 5
Electrophoresis:- Principle, procedure and application of free flow, zone electrophoresis (Paper electrophoresis, membrane electrophoresis Gel electrophoresis, PAGE, SDS-PAGE and disc PAGE). Isoelectric focussing, highvoltage electrophoresis, pulse field electrophoresis, immunoelectrophoresis. 2D electrophoresis	Week 7 Week 8 Week 9

Centrifugation:- Principle of sedimentation technique. Relationship with rpm and radius of rotation.
RCF and centrifugal force (xg). Different types of centrifuge and rotors. Principle, procedure and application of differential centrifugation, density gradient centrifugation, ultra centrifugation, rate zonal centrifugation, isopycnic centrifugation

Week 10

Week 11

Colorimetry and spectrophotometry:- Laws of light absorption -Beer - Lambert law. UV and visible absorption spectra, molar extinction coefficient and quantitation. Principle and instrumentation of colorimetry and spectrophotometry. Principle of nephelometry, fluorometry, atomic absorption and emission spectrophotometer.

Week 12

Week 13

Week 14

Principle and application of RIA. Measurement of radioactivity by GM counter and Scintillation counter. Autoradiography

Week 16

Week 17

Contact Details

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