



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 : Intermediary Metabolism 1 (2018-2019)

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| Name of the Stream | Science |
| Name of the Programme | BSc Biochemistry |
| Name of the Course | Intermediary Metabolism 1 |
| Nature of the Course | Core Course |
| Semester | Fifth |
| Lecturer(s) | Sulfikar Ali M |
| Name of the Coordinator | |
| Year | 2018-2019 |
| No of Credits | 3 |
| No of Contact Hours | 54 |
| Course Description | <p>This course will introduce the details in metabolic pathways of carbohydrates and its regulation , electron transport chain and oxidative phosphorylation</p> |
| Course Objectives | <ol style="list-style-type: none">1.learn essentially all of the reactions in the glycolytic pathway (substrates and products)2.understand where the free energy changes come from which allow production of ATP in glycolysis3.Know the activators and inhibitors of the major regulated enzymes in glycolysis and understand the metabolic logic of their function.4.What is "substrate level" phosphorylation?5.Understand the connection between glycolysis and glycogen synthesis & gluconeogenesis6.relationship between glycolysis, gluconeogenesis and the pentose pathway7. Understand how the ETC is coupled with ATP synthesis |
| Course Outcome | <p>To understand the importance of carbohydrates as storage molecules and as structural component</p> <ul style="list-style-type: none">• Understanding the importance of high energy compounds, electron transport chain, synthesis of ATP under aerobic and anaerobic conditions.• To acquire knowledge related to the role of TCA cycle in central carbon metabolism, importance of anaplerotic reactions and redox balance.• Students will be exposed with the fact energy transduction pathways are highly regulated |
| Assessment Method | <p>Assignments</p> <p>Homeworks</p> <p>Class Tests</p> <p>Unit Tests</p> <p>Term Exam</p> <p>Seminars</p> |

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| | Lectures |
| | Cooperative Learning |
| | LMS |
| Teaching Methods Used | Classroom Activities |
| | Seminars |
| | Tutorials |
| | Powerpoint Slides |
| Textbook | Principles of biochemistry, by Albert Lehninger, David L Nelson, Michael M Cox, CBS Publishers & Distributors Delhi ISBN 81-239-0295-6. Biochemistry: Donald. Voet and Judith G. Voet John Wiley & sons Inc. New York Chischester Brisbane, Toronto, singapore ISBN 0-471-58651-X |
| References | 1. Biochemistry by Lubert Stryer, W.H Freeman and Company, New York ISBN 0-7167-2009-4, 4th Edition. 2. Principles of biochemistry, by Albert Lehninger, David L Nelson, Michael M Cox, CBS Publishers & Distributors Delhi ISBN 81-239-0295-6. 3. Biochemistry: Donald. Voet and Judith G. Voet John Wiley & sons Inc. New York Chischester Brisbane, Toronto, singapore ISBN 0-471-58651-X |
| Internet Resources | http://nmc.itc.virginia.edu/pmh3g/enter.htm http://www.compumart.ab.ca/plambeck/che/p102/p02051.htm http://www.gwu.edu/~mpb/glycolysis3d.htm http://web.indstate.edu/thcme/mwking/glycolys.html#reactions http://web.indstate.edu/thcme/mwking/glycogen.html#catabolism http://www.kumc.edu/research/medicine/biochemistry/bioc800/car-lobj.htm http://www.kumc.edu/research/medicine/biochemistry/bioc800/opening.html http://www.gwu.edu/~mpb/index.html http://www.bic.nus.edu.sg/biocomp/list.html http://ecocyc.pangeasystems.com/~pkarp/pathways.html http://biochem.boehringer-mannheim.com/techserv/metmap.htm |

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 |

Name of the Course: Intermediary Metabolism I

Knowledge

Academic and Intellectual Skills

Self Learning

Cognitive Skills

Professional Skills

Communication Skills

Graduate Attributes

Critical and Analytical Skills

Research Skills

Personal Skills

Creative Thinking

Application Skills

Attitude and Values

Social Responsibility

Ethical Commitment

Course Schedule

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| Bioenergetics: Introduction, Biological oxidation, Role of high energy phosphates in energy transfer -redox potential | Week 1 |
| | Week 2 |
| Intermediary Metabolism: Catabolism and anabolism, metabolic pathways, experimental approaches in metabolism. Compartmentalization of metabolic pathways in cells and energy conversation. Approaches to study metabolism: using intact animals, bacterial mutants, in vitro, and radioactive isotopes. | Week 3 |
| | Week 4 |
| | Week 5 |

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| Carbohydrate metabolism (Structures, energetics and regulation of pathways) : | Week 7 |
| Glycolysis (aerobic and anaerobic), entry of other sugars into glycolytic pathway, TCA cycle, HMP shunt, gluconeogenesis, galactose and fructose metabolism, anaplerotic reactions, glyoxalate cycle. | Week 8 |
| Carbohydrate synthesis, Synthesis of starch, cellulose and peptidoglycans | Week 9 |
| Glycogen Metabolism: | Week 10 |
| Glycogenesis, glycogenolysis, regulation- Cori cycle (structures & regulation), | Week 11 |
| | Week 12 |
| Electron Transport Chain: Structure of mitochondria, sequence of electron carriers: NADH, ubiquinone | Week 14 |
| dehydrogenase, Succinate dehydrogenase, cytochrome reductase and cytochrome oxidase (outline of electron transport chain), Structure of ATP synthase -inhibitors of electron | Week 15 |
| transport chain. Oxidative phosphorylation: Sites of ATP production, Chemiosmotic theory (an | Week 16 |
| outline), P/O ratio, inhibitors and uncouplers, transport of reducing potentials into mitochondria. | Week 17 |

Contact Details

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