

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

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|-----------------------------------|---------------|
| Course name | Antibiotics |
| Course number | BIOL4328 |
| Faculty | |
| Department | |
| Course type | College Needs |
| Course level | 4 |
| Credit hours (theoretical) | 3 |
| Credit hours (practical) | 0 |
| Course Prerequisites | |

Course Objectives

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| 1 - | Distinguish between different types of antibiotics |
| 2 - | Mode of action of different antibiotics |
| 3 - | Describe the biological mechanisms of antibiotic resistance |
| 4 - | Understand the interaction between individual treated patients and the population in the spread of antibiotic resistance |
| 5 - | Understand the toxicology of antibiotics |

Intended Learning Outcomes

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|------------------------------------|---|
| Knowledge and Understanding | <ul style="list-style-type: none"> * Illustrate the importance, structural diversity, microbial sources of antibiotics. * Interpret the spectra, mode of action and side effects of antibiotics * Understand the complexity of antibiotic resistance |
| Intellectual Skills | <ul style="list-style-type: none"> * Distinguish the variation and the evolutionary lines of drug resistance among different pathogenic bacteria. * Discriminate the factors affecting antibiotic resistance in microorganisms |
| General Skill | <ul style="list-style-type: none"> * effectively team work for intensive learning |

Course Contents

- 1 - Introduction and discussion about the basic knowledge of students regard antibiotics
- 2 - Characteristics of Antibiotics and their basic mode of action
- 3 - Inhibition of bacterial cell wall Synthesis
- 4 - Antibiotics that affect the function of cytoplasmic membrane
- 5 - Antibiotics that inhibit nucleic acid synthesis
- 6 - Antimicrobial inhibitors of ribosome function
- 7 - Revision and Midterm Exam1
- 8 - Drugs that inhibit other biochemical targets
- 9 - Microbial resistance to antibiotics part I
- 10 - Microbial resistance to antibiotics part II
- 11 - Combinations of antimicrobial agents
- 12 - Toxicology of antimicrobial agents
- 13 - Revision and Midterm Exam 2
- 14 - Student presentation I
- 15 - Student Presentation II
- 16 - Final Exam

Teaching and Learning Methods

- 1 - Lectures
- 2 - Revision and Discussion sections
- 3 - Student presentation

Students Assessment

| <u>Assessment Method</u> | <u>TIME</u> | <u>MARKS</u> |
|--------------------------|-------------|--------------|
| First hour exam | 60minutes | 20 |
| Second hour exam | 60minutes | 20 |
| Presentations | | 10 |
| Final Exam | 120minutes | 50 |

Books and References

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| Essential books | Kenneth Todar.(2008) Textbook of bacteriology. University of Wisconsin, Madison, Wisconsin. Michael Madigan and John Martinko. (2005) Biology of Microorganisms. |
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Knowledge and Skills Matrix

| Main Course Contents | Study Week | Knowledge and Understanding | Intellectual Skills | Professional Skills | General Skill |
|---|------------|--|---|---------------------|---|
| Introduction and discussion about the basic knowledge of students in the field of antibiotics | 1 | to evaluate the basic knowledge of student in the field of antibiotics | Introduction to antibiotics | | Appreciate learning from literatures |
| Characteristics of Antibiotics and their basic mode of action | 2 | Characteristics of Antibiotics Microorganisms that produce antibiotics Biochemical Basis of Antimicrobial Action | Understanding the Action of Specific antimicrobial gents | | Knowledge about microorganisms and their ability to produce antibiotics |
| Inhibition of bacterial cell wall Synthesis | 3 | Role of beta lactam antibiotics and other antibiotics on the synthesis of bacterial cell wall | Understanding the mode of action of beta lactam antibiotics and other antibiotics | | |
| Antibiotics that affect the function of cytoplasmic membrane | 4 | Role of antimicrobial drugs on bacterial and fungal cytoplasmic membranes | Understanding the mode of action of some antimicrobial agents like polymyxin and imidazoles | | |
| Antibiotics that inhibit nucleic acid synthesis | 5 | Understanding the types of antimicrobial drugs interference with Nucleotide Synthesis and agents that Impair the Template Function of DNA or that inhibit the function of RNA-Polymerase | Role of 5-fluorocytosine, chloroquine and rifampin | | |
| Antimicrobial inhibitors of ribosome function | 6 | Understanding the antimicrobial inhibitors of Ribosome Function including antibiotics affect the 30S and 50S ribosomal subunits | explain the mode of action of aminoglycosides and tetracycline as well as other antibiotics | | |

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| Drugs that inhibit other biochemical targets | 8 | Understanding the biosynthesis of tetrahydrofolate | Structure of sulfonamide and trimethoprim with sites of inhibition of folic metabolism | | |
| Microbial resistance to antibiotics part I | 9 | Knowledge about The Genetic Basis of Bacterial Resistance to Antibiotics | meaning of natural and Acquired Resistances Resistance Due to Altered Receptors Resistance Due to Decreased Entry of a Drug | | |
| Microbial resistance to antibiotics part II | 10 | Knowledge about The Genetic Basis of Bacterial Resistance to Antibiotics | Resistance Due to Destruction or Inactivation of a Drug Synthesis of Resistant Metabolic Pathway | | |
| Combinations of antimicrobial agents | 11 | Understanding the reasons for combinations of antimicrobial drugs | synergy, indifference and antagonism | | |
| Toxicology of antimicrobial agents | 12 | Understanding the toxicity of some antimicrobial drugs on human health | sensitivity reactions | | |