

Kingdom of Saudi Arabia
Ministry of Higher Education
Majmaah University
College of Medicine



المملكة العربية السعودية
وزارة التعليم العالي
جامعة المجمعة
كلية الطب

BASIC THERAPEUTICS MODULE

MED 120

STUDY GUIDE
Phase II, Second year
Second Semester



Academic Year: 1432-1433 H (2011 – 2012 G)

A Message from the Dean



It is my pleasure to welcome you to the Majmaah University College of Medicine. I am indeed delighted to see that University of Majmaah is incredibly developing as a place for pursuing medical profession.

Our students are different and unique, but all share a common bond of intellectual excellence, motivation to a career in health care, high moral and ethical standards.

Our College of Medicine is positioned to make a positive difference in the health care of Majmaah and the country by providing the educational resources and environment for each student to grow academically, professionally and personally. As a relatively new college, our students will be involved in the change and growth of our programs and their excellence. New graduates would reflect on our processes and successes in medical education, and will help us in our continuing effort for improving the system.

Majmaah University College of Medicine has cultivated an open door and friendly environment to support the educational growth of our students. Our faculty continually strives to update and improve our curriculum and teaching methodologies, along with assessment tools. Our curriculum involves classroom didactics; problem based small group learning sessions, interactive classroom technology, Directed students learning sessions, and structured self-study modules. Our purpose is to make learning not only timely, effective and efficient, but also enjoyable. I again welcome you to this College and hope you will find here programs that meet your interests and future goals in medicine.

Dr. Mohammed O. Al Rukban
Dean, College of Medicine
Majmaah University

Dear Student

We are delighted to welcome you to the College of Medicine. This is your next important module that will inform and update you with different treatment modalities and related subjects.

We have a comprehensive list of interesting and effective teaching and learning methods to complement the highly relevant line up of content topics that you will be introduced to this module.

Learning here is light, entertaining and rewarding.

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GENERAL MODULE INFORMATION

Module Title	: Basic Therapeutics
Module Code & Number	: MED 120
Credit Hour	: 3 hours
Module Duration	: 4 weeks
Module Starting Dates	: 05Rabi Ul Awal; 1433 H (28 January, 2012 G)
Module Coordinator	: Prof. Mazen K. Qato

Module Committee Members :

- Prof. Mazen K. Qato
- Prof. Wahengbam PS
- Dr. Qazi Imtiaz Rasool
- Dr. Fahim Haider Jafari
- Dr. Sherif Saleh
- Dr. Muddasir Bandy
- Mr. Waqas Sami

Teaching Faculty:

- All Academic teaching staff of College of Medicine,
Al Majmah University.
- Dr Salameh Al Dajah, College of Applied Medical
Sciences, Al Majmaah University.

Module Description

The module focuses on the principles of therapeutics, both pharmacological & non-pharmacological means. The course covers the major principles & concepts of pharmacology including sources of drugs, pharmacokinetics, pharmacodynamics, pharmacotherapeutics & pharmacogenomics.

Furthermore, the course gives a brief concept about uses of drugs in geriatrics, pediatrics, in special situation like pregnancy and lactation and explains principles of adverse drug reactions with an importance of safe prescription writing.

The course will cover drugs interfering with autonomic nervous system, both cholinergic & adrenergic as well as autacoids. This module will discuss briefly some non-pharmacological modalities in therapy like physiotherapy, Radiotherapy, Laser therapy, Cryotherapy, Nutrition and diet therapy etc. Therefore, the module will create a foundation of basic therapeutics that can be applied to other body-system based modules. Specific drugs used in the treatment of specific disorders will be discussed under relevant modules.

Objectives of the Module:

At the end of this course the students should be able to:

1. enumerate the aims & objectives of therapy (A)
2. explain the basic concepts of drug safety, efficacy & potency (A)
3. illustrate the mechanism of drug actions (A)
4. describe route of drug administration & how the body deals with drugs in respect to absorption, distribution, metabolism & elimination (A)
5. discuss the usages of drugs in geriatric & paediatric in special situations such as pregnancy & lactation (A)
6. identify the variability of drug responses including common & important genetic variations in population (pharmacogenetics) (A)
7. describe the safe-drug prescribing strategies (A,B)
8. discuss non-pharmacological therapeutic modalities (A,B,C)
9. discuss ethics related to drug prescription (E)
10. evaluate and justify the selection of a drug using the current evidence (D)

This course will contribute to the achievement of all learning outcomes of College of Medicine, Majmaah University undergraduate curriculum. The overall learning outcomes of the course are :- (A) – scientific approach to practice; (B) – clinical expertise; (C) – community orientation; (D) – scholarship; (E) – professionalism.

Contents

Theme I:

1. Introduction to different therapeutic modalities.
2. Non-pharmacological basis of therapy (e.g. Physiotherapy, Radiotherapy, Laser therapy, Cryotherapy, Nutrition and Diet).
3. Introduction to Pharmacotherapeutics (Sources of drugs & Classification).

Theme II:

1. **How body handles drugs (Pharmacokinetics):**
 - a. Absorption.
 - b. Distribution.
 - c. Metabolism.
 - d. Elimination.
2. **How drug acts (Pharmacodynamics):**
 - a. Receptors (affinity, efficacy & potency).
 - b. Theory of drug receptors binding.
 - c. Signal transduction apparatus.
 - d. Therapeutic index and therapeutic window phenomenon.
3. **Individual variations in drug response (pharmacogenomics)**
 - a. Introduction to Pharmacogenomics.
 - b. Clinical relevance of Pharmacogenomics

Theme III:

1. **Autonomic nervous system drugs**
 - a. Adrenergic agonists & antagonists.
 - b. Cholinergic agonists & antagonists.
 - c. Skeletal muscles relaxants.
2. **Autocoids (histamine, serotonin & prostaglandins)**
 - a. Histamine and antihistamines
 - b. Serotonin and anti – serotonin
 - c. Prostaglandins and ergot alkaloids

Theme IV:

1. Drug therapy during pregnancy & lactation (to be covered in Obstetrics and Gynecology).
2. Principles of drug therapy in the geriatric & pediatric groups.
3. Adverse drug reaction (ADR).
4. Principles of toxicology.
5. Drug interactions (drug – drug interaction), (drug - food interaction) and(drug- disease interactions)
6. Safe prescribing habits.
7. Cost effective drug therapy.
8. Compliance, adherence & monitoring of drug treatment

DETAIL OBJECTIVES OF THE CONTENTS

Theme I:

1. Overview of the module

At the end of this session the students should be able to understand the objectives of the module.

2. Introduction to different therapeutic (Pharmacological and non Pharmacological) modalities:

At the end of this session the students should be able to:

- define and categorize the therapeutic modalities.
- explain Physiotherapy, cryotherapy, electrotherapy, thermotherapy, radiotherapy, laser therapy, Nutrition and Diet therapy.
- name the different sources of drugs.
- categorize different drugs used for therapy.

3. Non-pharmacological basis of therapy :

At the end of this session the students should be able to:

- differentiate between pharmacological and non-pharmacological therapies.
- define Complimentary and Alternative Medicine (CAM), Homeopathy ,Spiritual therapy and discuss clinical implications.

4. Introduction to pharmacotherapeutics:

At the end of this session the students should be able to:

- recall the history of pharmacology.
- describe the nature of drugs.
- interpret the drug and body interaction.
- explain the Pharmacodynamic and Pharmacokinetic principles.

Theme II:

1. Pharmacokinetics:

At the end of this session students should be able to:

- list and discuss the common routes of drug administration & elimination.
- compare & contrast between first order & zero order drug absorption & elimination.
- use the pharmacological implication of Henderson Hasselbach equation.
- discuss factors in health and diseases affecting drug distribution and metabolism.
- describe the mechanism of hepatic enzyme induction & list 3 drugs that induces & 3 drugs that inhibit hepatic metabolism.
- assess three drugs for which there are well defined, genetically determined differences in metabolism.
- estimate the loading dose & the maintenance doses of a drug.

DETAIL OBJECTIVES OF THE CONTENTS

2. Pharmacodynamics:

At the end of this session students should be able to:

- describe the affinity, efficacy and potency of two drugs on basis of their graded dose response curve (DRC).
- explain the role of antagonists in therapeutics.
- explain the full agonist, partial agonist, inverse agonist & antagonist.
- differentiate between different types of antagonists based on its effect on dose response curve with examples.
- compare and contrast the mechanism of cholinergic and adrenergic receptors regulations.

3. Pharmacogenomics:

At the end of this session students should be able to:

- define pharmacogenomics.
- explain the clinical relevance of pharmacogenomics.

Theme III:

1. Drugs affecting autonomic nervous system:

At the end of this session students should be able to:

- discuss the synthesis and degradation of acetylcholine and norepinephrine.
- describe the involvement of these compounds in genetic diseases like Phenylketonuria (PKU) and mention drugs which interfere with its metabolism.
- discuss the role of these indigenous substances in controlling voluntary & involuntary functions of the body.
- describe the drugs that mimic or antagonize the action of these compounds.

2. Histamine, serotonin and prostaglandins:

At the end of this session students should be able to:

- describe the synthesis, degradation and effects of histamine, serotonin (5-HT) & prostaglandins.
- explain the pharmacology of the generation and sub-group of anti-histamines.
- compare one 5 – HT2 with one 5 – HT3 antagonist & their major applications.
- list the major clinical applications & toxicities of ergot alkaloids on the major organ systems.

DETAIL OBJECTIVES OF THE CONTENTS

Theme IV:

1. Principles of drug therapy in pediatrics and geriatrics:

At the end of this session the students should be able to:

- a. describe how the efficacies of drugs vary according to age.
- b. explain the pharmacokinetics and pharmacodynamics of teratogenicity & carcinogenicity of drugs.
- c. discuss principles of prevention and management of adverse drug reactions for children & adults.

2. Rational prescribing and prescription writing:

At the end of this session the students should be able to:

- a. describe how to make specific diagnosis and its pathophysiological implications of diagnosis.
- b. select the drug of choice based on the specific therapeutic objectives and apply the safe prescribing habits.
- c. determine the appropriate dosing regimen.
- d. assess the adverse drug reaction (ADR), toxicity and interaction with food and other drugs.
- e. evaluate the cost effective drug therapy (pharmacoeconomics).

3. Therapeutic Drug Monitoring and Compliance:

At the end of this session the students should be able to:

- a. review the therapeutic monitoring of drugs with low therapeutic range.
- b. evaluate the compliance and adherence towards drug treatment.

Problem-Based Learning (PBL)

1-PBL-1:

A 26-year old man was brought by friends to the emergency department with bizarre behavior.

2- PBL-2:

A lady with serious drug complications.

Seminars

1. Guidelines for Seminar Sessions:

- 1- Two seminars are scheduled during the block. Duration of each seminar is 2 hours.
- 2- The whole batch of 2nd year students of the College of Medicine will be divided into four groups, A, B, C & D (9 to 10 students for each group).
- 3- Groups are recommended to assign a group leader chosen by students. Each group leader will be in charge for contacting the Module Coordinator, Prof. Mazen K.Qato
- 4- A staff member will be assigned as a Seminar Supervisor for each group.

The Seminar Supervisor will take care of his group regarding:

- assigning students for giving presentations in coordination with the group leader.
- assigning of topics of seminar in coordination with group leader.
- direct helping and advising students during preparation of presentations.
- leading and supervising of seminars regarding securing convenient venue, managing timing for each presentation and keeping order during seminar session.
- facilitating group discussion after each presentation.
- Assessing students (those who give presentations and also who do not give presentations).

5- Three to four students are assigned for giving presentation in each seminar.

6- Each of the assigned students has to prepare a presentation for his assigned topic.

- The presentation should be formatted by Microsoft office PowerPoint program.
 - Only 5-8 slides are required for each presentation.
 - Presentation should last for 7-10 minutes only. 5 minutes will be allowed for whole group discussion.
 - 5-10 minutes are devoted for the tutor for giving feedback and comments.
- 7- Other students (not giving presentations) have to properly prepare among themselves with active collaboration & discussion by reading topics related to seminar before attending the seminar (**NOT JUST PASSIVE LISTENING**).

8- All students should consider that they are assessed by the assigned tutor (not only the presenters of the seminar).

9- Topics discussed during seminars can be examined in the module written exams in the form of scenario based questions and/or SEQs.

Seminars

2. Topics & Objectives of Seminars:

A. Common mistakes in prescription writing

Objectives: At the end of this seminar session, students will be able to:

1. Discuss general guidelines of prescribing a medication
2. Discuss common sources of prescribing errors
 - (e.g., wrong medications, wrong patients, allergy) and ways to prevent the errors
3. When given a case scenario, identify the sources of error and categorize the error according to proximate or systemic problem
4. Recognize professional responsibilities and roles in practicing safe prescribing habits
5. Initiate the process of becoming a life-long advocate of safe prescribing

B. Therapeutic drugs monitoring

Objectives: At the end of this seminar session, students will be able to:

1. Recognize importance of drug monitoring in the holistic management of patients
2. Develop a thorough understanding of common concepts used in drug monitoring such as therapeutic index, toxic dose, therapeutic dose
3. Identify the commonly used drugs that needs close monitoring
4. Discuss concepts of drug-drug, drug-disease interaction (with examples)
5. Recognize common diseases and conditions that requires dose adjustments and closer monitoring
6. Discuss concepts of drug contraindications (with examples)

Cases for Discussion

CD-1. Cases for Discussion: Polypharmacy

A 65-years old female was diagnosed as dyslipidemic and obesity (BMI=39) 20 years ago. She used to get her physical check up & prescription for anti-hyperlipidemic medication from an outpatient clinic in her city. A special diet management was also advised for her. Routine blood lipids, blood glucose analysis, and other tests were done during follow up visits.

About 5 years ago, on her routine visit to the clinic, her regular physician informed her that she had developed hypertension and type-2 diabetes. However, her hypertension was difficult to control. Meanwhile, her regular physician moved out of the city and she is yet to be assigned to a new regular physician. Accordingly, she has been visiting different doctors each time. During several of these visits, her physicians kept noticing her blood pressure is high and they added new medications to her. Finally, her blood pressure improved after three medications (Ca Channel blocker, ACE inhibitor and diuretic). In addition, one of the doctors prescribed her low dose aspirin to prevent any blood clot forming in her system. She received one oral hypoglycemic drug to control her diabetes and a medication to control her appetite.

Meanwhile, she developed knee-pain. She was referred to an orthopedic doctor about three months back. She was diagnosed to have osteoarthritis of both knees. She was given Naproxen, a pain reliever, to take.

Four weeks following the hospital discharge she presented to emergency department with giddiness and vomiting of blood. In Emergency room, she was found to be tachycardic, diaphoretic and hypotensive. She needed extensive resuscitation and admitted to Intensive care unit (ICU) for upper GI bleed.

Questions for discussion:

- 1 - What are the issues related to this case?
- 2 - What are the problems with this lady and medication prescribed for her in many occasions ?
- 3 - What precautions should be taken to avoid drug-drug interactions?
- 4 - What is the basis of ideal prescription for this lady?
- 5 - How could you deal with side effects of her medication?
- 6 - How could you prevent this from happening again?

Cases for Discussion

CD-2. Cases for Discussion (Non-Compliance)

A 19-years-old type-1 diabetic patient is on insulin for the last 10 years. He was always advised by his physicians & clinical pharmacologists not to stop medication without consultation; not to change dose of the medications without first consulting the doctors; and not to have meals without the insulin.

About a year-ago, he moved to a new college in another town. He has been busy with study and other social activities. He feels it is getting difficult for him to continue the medication on schedule. On several occasions he missed his insulin dosages. As the examination nears, he starts to eat more under stress and his hours become more unpredictable. One morning, his room-mate found him drowsy and difficult to wake him up. He is rushed to the local emergency room.

On examination, he looked drowsy with sluggish responses. His respiration rate was increased. A medical student attending him thought his breath smelt different. His blood

glucose was 520 mg/dl & his urine showed presence of ketone bodies (acetoacetate).

His blood gases showed metabolic acidosis. He was diagnosed to have diabetic ketoacidosis and admitted to the hospital for further management. During his hospital stay, he was given insulin, glucose, potassium & bicarbonate. After few days, he was discharged from the hospital.

Questions for discussion:

1. What is the primary mechanism underlying the patient's condition?
2. What factors contributed to his not taking the insulin?
3. How his condition can be avoided in the future?
4. What advice do you have for him & his room-mates on discharge?
5. What are the common factors for non-compliance in general?

Field Visits

I. Guidelines for field visits:

- 1- Students should follow instructions given to them prior to the visit.
- 2- A handout is given to students before every visit illustrating program, objectives and other details concerning the visit. Students are required to read handouts carefully.
- 3- Students are encouraged to go to hospital utilizing transportation which is secured by the College Administration. Transportation will be available half an hour prior to visit.
- 4- Students are expected to behave as future doctors. However, any misconduct by any student will be reported to the College Administration for appropriate measures according to University Rules.
- 5- At the end of each field visit, students are required to give their feedback regarding fulfillment of the objectives of the visit and clarify any comments and suggestions they may have. Feedback will be discussed in a scheduled session that will be held after the visit in the College.

II. Objectives of field visits:

1. Saudi Pharmaceutical Industry and Medical Appliances Company (SPIMACO)

At the end students will be able to

- a. identify local pharmaceutical industry.
 - b. know steps of drug manufacturing.
 - c. discuss Saudi food and drug administration (SFDA) regulations in drug manufacturing and registration.
 - d. compare the international and other national drug regulations and treaties.
2. King Fahad Medical city, Riyadh.

At the end students should be able to;

- a. discuss the role of physicians, nurses and pharmacists in hospitals specially in drug monitoring.
- b. justify the use of Therapeutic Drug Monitoring (TDM).
- c. identify the drugs for which therapeutic drug concentration monitoring is mandatory.
- d. know therapeutic range of various drugs for which TDM is essential.
- e. discuss therapeutic window and therapeutic index.
- f. discuss the serious consequences if therapeutic monitoring of drugs with low therapeutic index is not considered.

Practicals

Practical 1:

Handling of commonly used Experimental animals and Effects of various drugs on Rabbit Eye.

Practical 2:

Preparation, composition and uses of Various IV fluids with one example (IV Normal Saline)

Practical 3:

Preparation, composition and uses of one common drug mixture, with one example (Carminative Mixture/ calamine lotion/Disinfectants etc.).

Practical 4:

Preparation, composition and uses of common Antiseptics, with one example (Tincture Iodine).

Practical 5: Physiotherapy practical

- Therapeutic exercises
- Electrotherapy
- Neurological exercises
- Cardio respiratory rehabilitation

Practical 6: Visit to King Khalid Hospital for practical demonstration in:

- Laser therapy in Department of Ophthalmology.
- Cryotherapy and Ultra violet rays therapy in the department of Dermatology.
- Nutrition and Diet therapy in the department of Nutrition and Dietetics.
- Surgical and Orthopedics related therapeutic managements

Weekly Time Plan

Week-3				
Starting Date:	Saturday	Sunday	Monday	Tuesday
Day:	11/02/2012	12/02/2012	13/02/2012	14/02/2012
Date:	11/02/2012	12/02/2012	13/02/2012	14/02/2012
08:00 – 09:00 am	MID-TERM EXAMINATION	Autocoids (serotonin & anti-serotonin) Dr. Muddasir	Drug therapy during pregnancy & lactation Dr. Ashraf	Adverse drug reactions Dr. Ashraf
09:00 – 10:00 am	Practical Demonstration of Physiotherapy-3 Dr. Salamah	Practical-3 AB- Pharmacology CD- Physiotherapy Group AB (Dr. Muddasir & Dr. Mazen)	Therapeutic drug Monitoring Dr. Muddasir	Feedback of field visit from students -Prof. Mazen
10:00 – 11:00 am	Autocoids (histamine & anti-histamine) Dr. Muddasir	University Selective Course-1	Arab Linguistics	Drug interactions Dr. Qazi
11:00 – 12:00 noon	Demonstration of Practical-3 Dr. Muddasir	Prayer and Lunch Break		Drugs therapy in geriatric & paediatric group Dr. Wahengbam
12:00 – 01:00 pm				Prayer and Lunch Break
01:00 – 02:00 pm	PBL-2(a) Group A- Dr. Mazen Group B-Dr. Ashraf Group C- Dr. Qazi Group D- Dr. Muddasir	Practical-3 AB- Pharmacology CD- Physiotherapy Group AB (Dr. Muddasir & Dr. Mazen) Group CD (Dr. Fawaz & Dr. Amir) with Physiotherapy team)	Practical-3 CD- Pharmacology AB- Physiotherapy Group CD (Dr. Muddasir & Dr. Mazen)	FIELD VISIT TO King Fahad Medical Centre, Riyadh.
02:00 – 03:00 pm		Prayer and Lunch Break	Group AB (Dr. Fawaz & Dr. Amir) with Physiotherapy team)	

Basic Therapeutics	PBL	CD	DSL	University selective course	Arab Linguistics	Practical
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Week-4				
Starting Date:	Saturday	Sunday	Monday	Tuesday
Day:	18/02/2012	19/02/2012	20/02/2012	21/02/2012
Date:	18/02/2012	19/02/2012	20/02/2012	21/02/2012
08:00 – 09:00 am	Safe prescribing habits Dr. Wahengbam	Compliance & adherence Dr. Muddasir	Relationship between pharmaceutical industry & physicians Prof. Mazen	Principles of Toxicology Prof. Mazen
09:00 – 10:00 am	DSL Dr. Wahengbam	Demonstration of Practical-4 Dr. Muddasir	Cost Effective Drug Therapy Dr. Fahim Haider	DSL Prof. Mazen
10:00 – 11:00 am	Practical Demonstration of Physiotherapy-4 Dr. Salamah	University Selective Courses- 1	Arab Linguistics	Placebo Dr. Fahim Haider
11:00 – 12:00 noon	DSL Dr. Muddasir			Non Pharmacological basis of therapy Dr. Khalid
12:00 – 01:00 pm		Prayer and Lunch Break		Prayer and Lunch Break
01:00 – 02:00 pm	PBL 2 All teachers including the concerned group teachers	Practical-4 AB- Pharmacology CD- Physiotherapy Group AB (Dr. Muddasir & Dr. Mazen) Group CD (Dr. Ashraf & Dr. Amir) with Physiotherapy team)	Practical-4 CD- Pharmacology AB- Physiotherapy Group CD (Dr. Muddasir & Dr. Mazen)	Autocoids (prostaglandins) Dr. Amir
02:00 – 03:00 pm			Group AB (Dr. Ashraf & Dr. Amir) with Physiotherapy team)	DSL Dr. Amir

Basic Therapeutics	PBL	CD	DSL	University selective course	Arab Linguistics	Practical
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Theme	Feedback and Revision	Theory Examination	Practical Examination
Day	Saturday	Sunday	Monday
Date	25/02/2012	26/02/2012	27/02/2012
8 AM-9 AM	Discussion Dr Mazen	Theory From 9AM- 12 Noon	Practical From 9 AM onwards
9AM-10AM	Feedback Discussion from students Dr Khalid		
10 AM-3 PM	Revision		

Teaching and Learning Methods in Detail:

This section provides an elaboration of the teaching and learning methods that will be used to deliver this module. The teaching and learning methods in details will be imparted through the following teaching methods.

- A. Interactive lectures
- B. Small group learning sessions (PBL)
- C. Students directed learning sessions(SDL)
- D. Practicals
- E. Skills lab sessions
- F. Clinical teaching and learning sessions
- G. Student-led seminars

A. Interactive lectures

Introduction

Interactive lectures are similar to the lectures used in all other parts of the curriculum, or anywhere else. They are, however, not the didactic lectures used in the past.

Process

The lecturer will involve the students in active discussion, and may provide brief learning activities during the lecture to achieve the learning objectives stated under each topic. Occasionally, there will be more than one lecture/lecturer to achieve all the learning objectives given under one topic. As much as possible, where ever applicable, the lectures will highlight clinical application of the content material. Students could take notes during : lecture, but the lecture slides will be available on smart board (i.e. the learning management system of the university).

Teaching and Learning Methods in Detail:

B. Problem base learning (PBL) Sessions

Introduction

These are activities where students are divided in a small group of about 10 under the supervision of a tutor/facilitator. One of the important methods of small group learning is PBL, where the students first will be trained how to work in a PBL.

Process

Detail guidelines as to how a PBL is conducted are provided separately. Please go through these guidelines carefully before participating in the PBL learning.

C. Directed students learning (SDL) sessions

Introduction

In this method students will prepare for a relevant topic on a given 'curriculum facet'. The curriculum facet for discussion will be selected by the tutor. The topics related to a given curriculum facet could be either selected by the tutor or by the student, but pre-agreed with the tutor. The student will prepare for a 30-minute presentation on the topic and deliver it to the whole batch. There will be at approximately one large group learning session every two to three weeks.

Process

1. Tutor selects a curriculum facet relevant to the module/theme that is being learned at that time.
2. Tutor asks for three student volunteers who are willing to prepare for all the three in 30-minutes presentations.
3. The three volunteer students will discuss with the tutor and agree on three topics under a given curriculum facet. For example, if the curriculum facet selected by the tutor is 'The actions of the body on the drug i.e. pharmacokinetic process' students can make presentations on various pharmacokinetic parameters like "Absorption process of drug, Distribution and Bioavailability of a drug, Metabolism or Biotransformation of a drug etc. These topics will be either selected by the tutor or by the students with the concurrence of the tutor.
4. For a given learning session, in 2 hours duration, all the three students will deliver in 30-minute presentation on a particular theme, selected by the tutor. After each 30-minute presentation there will be a 10-minute interactive discussion.
5. Finally, the tutor will summarize the presentations of the session in the last 10 minutes.

Teaching and Learning Methods in Detail:

D. Practical

Introduction

Practical are designed to illustrate the concepts and principles taught to the students in lectures. Thus, the practical will provide an opportunity for the students to acquire hands-on

experience on an abstract concept or a principle they learned in the lectures; i.e.

the students will experience for themselves how an abstract concept or a principle

practically operates. Every theme that is studied within each module will have several

practical sessions. The topics of the practical sessions will be determined by the tutor as

appropriate. A practical will be held for 2 hours in the 'system-based laboratories' under

the guidance of a tutor.

Depending on the nature of the subject matter taught within a module, a given module may or may not contain practical.

Process

1. Tutors who teach in a particular theme, in collaboration with each other will determine a appropriate number of practical for a given theme.
2. Objectives of a given practical session will be developed and given to the students by the tutor before the practical.
3. Students will be pre-informed about a given practical topic. Depending on the type of practical and facilities available, 25 to 50 students will take part in a given practical session.
4. Students will record findings of the practical in a separate Practical Record Book.
5. At the end of the session the tutor will summarize the main learning points illustrated during the practical.

E. Skills lab sessions

Introduction

Students will use the newly built, state-of-the-art skills lab to train the students in certain important practical, clinical skills from 2nd year (i.e. Phase 2). An example for a skills lab session would be blood pressure measurement. Depending on the nature of the module, there may or may not be skills lab sessions for a given module.

Process

1. The tutors who teach within a module in collaboration with each other will determine the number of skills lab sessions per module.
2. The tutors will then draw up the objectives for each session and inform the students about the objectives of the session prior to the skills lab session.
3. Depending on the nature of the skills lab session, students will either participate in small groups or as the whole batch.
4. Depending on the skill, the students will perform the skill either on themselves, on each other or on a simulator.
5. The students will record the findings of the skills lab session in a separate Skills Lab Record Book.
6. The tutor will at the end of the session summarize the main learning points.

Teaching and Learning Methods in Detail:

F. Clinical teaching and learning sessions

Introduction

Where relevant the students in small groups of 10, will visit a clinical setting, observe or experience how a given concept or principle is clinically applied. Depending on the nature of the subject matter being taught, there may or may not be clinical teaching and learning sessions within a given module.

Process

1. The tutors responsible for teaching and learning for a given module will determine the topics for which there will be clinical teaching and learning sessions.
2. The tutors will then draw up the objectives of a given session and communicate it to the student prior to the session.
3. The students will be divided into groups of 10.
4. A tutor will accompany the students to the clinical setting or a clinician (who is aware of the objectives of the session) from the relevant clinical setting will be assigned to show the students the relevant procedures that they need to observe or do.
5. Students will record their experience or observations in a 'Clinical Teaching and Learning Record Book.

G. Students-led seminars

Seminars are a student-centered teaching and learning method. Students work in groups on a common theme/topic, and then they present their work to all the students. Since all the students present on the same topic, seminars lead to a rich accumulation of information. The tutor will summarize and highlight the important points of all presentations at the end.

Process

The guidelines for seminar session and process are already explained .

Assessment:

This module comprises of two types of assessment.

A. Continuous assessment – these assessments will take place throughout the course. They are mostly based on the PBL sessions, skill lab, practical and clinical activities. Also there will be SEQ/MCQs as mid module examination. A proportion of marks (40%) from these assessments will contribute to the final summative module assessment.

B. Final assessment - The eligibility criterion for sitting the final examination will be the completion of 75% of attendance. This is the end of the module assessment, and will be held under formal examination conditions, including SEQ, MCQ, OSPE, OSCE and so forth. A proportion of marks (60%) from this assessment will contribute to the final summative mark of the module assessment.

Total Marks = 100 Marks; distributed as follows:

- Midterm examination worth 20% (MCQ/SEQ).
- Students' evaluation throughout the small group sessions 10%.
- Student-led seminars or assignment 10%.
- A final examination at the end of the semester worth 25% (MCQ).
- Short Essay Questions (SEQ) 15%
- OSPE/OSCE 20%

Teaching Methodology:

The instructional techniques are:

- Interactive Lectures
- Small-group/problem-based learning sessions
- Students-led integrated seminars or assignments
- Demonstration and practical sessions in laboratories or in the hospital
- SDL
- Independent & self-directed Learning

Quality Assurance and Evaluation Process:

Any new course, or for that matter any old course, needs constant reviewing and monitoring to ensure that it meets the demands placed on it by the overall curriculum. This curriculum is no exception. Hence, there will be a number of evaluation processes employed in the module. They are as follows.

1. Student feedback at the end of the module, seeking student comments on both teaching and learning, and assessment, along with views on the general course organization and implementation
2. Student feedback of a sample of teaching and learning activities
3. Tutor feedback
4. Examiner feedback
5. Peer evaluation, where a staff member may visit a particular teaching and learning activity and provide formative feedback about its conduct
6. Analysis of the students' examination results
7. External reviews.

Resource Materials:

1. Illustrated reviews Pharmacology, Lippincott. 4th Edition, 2009.
2. Katzung & Trevor's Pharmacology 9th edition, 2010.

Tutor Contact Information:

1. Prof. Mazen K. Qato, kqato@hotmail.com
2. Prof. Dr. Wahengbam PS, waheedpks@yahoo.com
3. Dr Fahim Haider Jafari, Fahimjafari@gmail.com
4. Dr. Sherif Saleh, sasaleh65@hotmail.com
5. Dr. Muddasir, banday.muddasir@gmail.com
6. Dr. Muhammed Ashraf, shakardara@hotmail.com

للتواصل :

064042269-064042272

للمراسلة :

جامعة المجمعة ص.ب 66 المجمعة 1952

البريد الإلكتروني :

medicine@mu.edu.sa

زورنا على

www.mu.edu.sa