



Chemical Pathology Course Specification

Master Degree in Clinical and Chemical Pathology

Program on which the course is given: Master of Clinical and Chemical Pathology

Department offering the program: Clinical and Chemical Pathology Department

Department offering the course: Clinical and Chemical Pathology Department

Course code: CCP 822 CP

Element of the program (Compulsory/Elective): Compulsory course

Academic year: 2015-2016

Date of approval: July 2015

Credit points: 5 Credit points

Course duration: 16 weeks

Teaching hours: Theoretical 70% and Practical 30%

Course Coordinators:

- Prof. Dr. Lamia Mansour
- Assistant Prof. Rania Darwish

I. AIM OF COURSE

The aim of this course is to provide graduates with the knowledge, understanding, technical skills and attitudes needed for efficient and safe performance, of various clinical chemistry tests according to acknowledged international standards for performance, health and safety.

II. INTENDED LEARNING OUTCOMES

A. Knowledge and Understanding:



By the end of the course the candidate should be able to:

1. Describe various pathophysiological processes of various body systems.
2. Describe the clinical usefulness and limitations of clinical chemistry tests.
3. Explain basic molecular biology concepts
4. State the application of molecular diagnostics in laboratory medicine

B. Intellectual Skills:

By the end of the course the candidate should be able to:

1. Compare between different methods used for analysis of common analytes.
2. Interpret biochemical test results in the context of available clinical information.
3. Analyze common laboratory problems effectively.
4. Compare between various molecular diagnostic techniques.
5. Relate pathophysiology to test results in health and disease

C. Professional and Practical Skills:

By the end of the course the candidate should be able to:

1. Select the appropriate biochemical test and method for a certain clinical problem.
2. Perform routine chemistry tests accurately and precisely.
3. Detect common interferences, and sources of error affecting laboratory test results, whether pre-analytical, analytical, or post-analytical
4. Select the appropriate molecular technique for a required genetic analysis
5. Adopt health and safety policies and procedures in the lab.
6. Provide advisory services to colleagues of other specialties.

D. General and Transferable Skills:

By the end of the course the candidate should be able to:

1. Participate in case discussions with colleagues.
2. Communicate effectively with patients and their families, showing professionalism, empathy, and respect to their dignity and confidentiality.
3. Use laboratory resources in a cost effective manner
4. Work as a team with medical and non-medical laboratory staff to deliver state of the art service, while applying time management skills
5. Recognize one's own limitations, and when to ask for consultant's advice
6. Demonstrate competent use of information technology including word processing, use of data bases, statistical program, laboratory, and hospital information systems.
7. Recognize learning opportunities for continuous professional development



III. COURSE CONTENT

i. Compulsory Course Chemical Pathology

ii. Main topics: Students will receive presentations or group discussions about recent advances in the following subjects:

Molecular Biology
1. Basics of molecular biology
2. Clinical genetics
3. Cell cycle
4. DNA Damage, Repair and Linkage Analysis
5. Molecular techniques
6. Gene expression
7. Epigenetics
8. Molecular basics of cancer

Pathophysiology of the Kidney
1. Physiology of the kidney.
2. Urine examination.
3. Abnormal constituents of the urine and tests measuring GFR.
4. Tubular function tests, water deprivation tests
5. Renal tubular acidosis.
6. Renal pathophysiology.
7. Non protein nitrogenous compounds



Endocrinology
1. Introduction to endocrinology
2. Steroid hormones
3. Anterior pituitary
4. Stimulation tests
5. Posterior pituitary
6. Catecholamines and serotonin.
7. Thyroid gland
8. Hormones regulating blood glucose
9. Hyperglycemia
10. Hypoglycemia
11. Parathyroid gland
12. Obesity
13. GIT hormones

Lipids
1. Lipoprotein disorders
2. Analysis of lipids, lipoproteins and apolipoproteins
3. Testing for risk of cardiovascular disease
4. Oxidants and antioxidants

Enzymes of Clinical Importance
1. Enzymes used in diagnosis of liver disease
2. Amylase and lipase
3. Enzymes as cardiovascular risk markers



Water, Electrolytes, and Acid Base Disorders

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|---------------------------|
| 1. Water and electrolytes |
| 2. Acid base disorders |

Liver and GIT

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|-------------------------------------------------|
| 1. Hemoglobin, iron and bilirubin |
| 2. Liver functions |
| 3. Gastric, pancreatic and intestinal functions |

Bone and Mineral Metabolism and their Disorders

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| 1. Calcium, Phosphate, magnesium |
| 2. Hormones regulating mineral metabolism |
| 3. Integrated control of mineral metabolism |
| 4. Biochemical markers of bone turnover |
| 5. Metabolic bone diseases |

Inborn Errors of Metabolism and Neonatal Screening

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|-------------------------------------------------------|
| 1. Amino acid metabolism & aminoaciduria |
| 2. Inborn errors of amino acid metabolism |
| 3. Inborn errors of carbohydrate metabolism |
| 4. Neonatal screening |
| 5. Lysosomal, peroxisomal, and mitochondrial disorder |
| 6. Inborn errors of metabolism, an overview |

Therapeutic Drug Monitoring, Toxicology and Drugs of Abuse

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|--------------------------------|
| 1. Therapeutic drug monitoring |
| 2. Drugs of abuse |



3. Toxic elements

Miscellaneous Topics

1. Specific proteins
2. Porphyria
3. Cardiac markers
4. Tumor markers
5. Renal tubular acidosis.
6. Vitamins and trace elements
7. Point of care testing
8. Analysis of body fluids

iii. Course contents: Distribution of course contents

SUBJECTS	Lectures /tutorials (hrs)	Practical (hrs)	Total (hrs)	% of Total
1. Molecular biology	8	-	8	7
2. Pathophysiology of the Kidney	5	14	19	16
3. Endocrinology	14	3	17	15
4. Lipids.	5.5	7	12.5	11
5. Enzymes of clinical importance	6	14	20	17
6. Water, electrolytes and acid base disorders	3	-	3	3
7. Bone and mineral metabolism and their disorders	1.5	5	6.5	6
8. Therapeutic drug monitoring and drugs of abuse	3.5	-	3.5	3
9. Liver and GIT	3.5	8	11.5	10



10. Inborn errors of metabolism and neonatal screening	4	-	4	3
11. Miscellaneous topics	8	2	10	9
TOTAL	62	53	115	100

IV. TEACHING METHODS

The course will be managed through the following teaching methods:

1. Lectures: Lectures are given 3 days/week for 16 weeks. On each day, two 45 min lectures are given.
2. Practical Classes: practical classes are run twice a week for 20 weeks
3. Clinical case presentations and discussion: six sessions given on three days at the end of the course.



V. LIST OF REFERENCES

- Course notes
- Text books
 1. Clinical Chemistry, Principles, Techniques and Correlations. ISBN-13: 978-1451118698, ISBN-10: 1451118694
 2. Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics. ISBN: 978-1-4557-4165
 3. Tietz Clinical Guide to Laboratory Tests. ISBN-13: 978-0-7216-7975-4



VI. TEACHING AND LEARNING FACILITIES

- Lecture halls provided with a whiteboard
- Audio-visual aids: Data show, overhead projection.
- Post graduate laboratory
- Hospital laboratory



VII. ASSESSMENT

Assessment criteria:

The prerequisite for sitting to the final exam is 75% attendance of the lectures and fulfilling all the credit points specified for the scientific activities, the training program and the elective course which should be registered in the log book.

Assessment tools:

- Continuous assessment is carried throughout the course and registered in the logbook
- Formative assessment through assessment exams during and after completion of the course
- Final summative examination; written, practical and oral.

Assessment schedule:

The final exam is held twice per year in May and November.

Day 1: written exam, Day 2: practical exam, Day 3: oral exam

Examination description:

- **Written exam:** Duration: 2 hours, Format: MCQ and short essay question.
- **Oral exam:** student is examined by a board of 2-3 professors using viva cards
- **Practical exam**

Weighing of assessment:

Exams	Marks	Intended Learning Outcomes
Written	100	A1, A2, A3,A4, B1,B2, B4, B5,C4,D3
Oral	75	B2, B3, B5,C1,C4,D1,D3,
Practical	75	B2, B3, B5,C1,C2, C3,C5,C6
Total	250	

Cairo University - Faculty of Medicine

Clinical and Chemical Pathology Department

Second Part Master Compulsory – Chemical Pathology [CCP 822 CP]



Head of Department

Prof. Dr. Fatma El Mougny