Course Specifications

Programme(s) on which the course is given **B.Sc. Mathematics, pure mathematics, Computer science and pure mathematics and statistics**
Major or Minor element of programmes **Major**
Department offering the programme **Mathematics**
Department offering the course **Mathematics**
Academic year / Level **First (1)**
Date of specification approval **September 2012**

A- Basic Information

Title: Mathematical Analysis 2 **Code: M114**
Credit Hours: 4 hrs. Lecture: 3 hrs.
Tutorial: 2 hrs Practical: 0 Total: 4 hrs.

B- Professional Information

1 – Overall Aims of Course

Introduce basic definitions about real functions, types of real functions, operations on functions. Develop skills on continuity and uniform continuity of function. Teach and use definite and indefinite integrals. Illustrate several applications on integration. Develop skills on geometrical interpretation of derivatives.

2 – Intended Learning Outcomes of Course (ILOs)

a- Knowledge and understanding:

On completion of the course, successful students should be able to:

a1- Realize a knowledge and understanding of fundamental definitions and ideas of differentiation and integration
a2- Have good knowledge about the mathematical terminologies used in this course

a3- Develop the knowledge about the methods of solutions of some ideas taught in this course for further use in other applied and computational courses.

b- Intellectual skills

On completion of the *course* , successful students should be able to:

b1- Construct a program of exercises according to the type of the course

b2- Formulate the topics of the course into groups according to their application

b3- Identify the different methods introduced in the course for suitable use in dealing with problems in Mathematical Analysi

b4- Recognise ideas of the course like as Taylor infinite series, maxima and minima, L' Hospital rule in application in Physics and applied mathematics and to be able to use appropriate mathematical tools in physics problems

c- Professional and practical skills

On completion of the course, successful students should be able to:

c1 Apply a program of exercises based on the tools they learned in the course.

c2 Test the outcomes of the course through its use in practical application in different scientific fields.

c3 Write the results of Mathematical ideas, in formal presentations, both oral and written

d- General and transferable skills

On completion of the course , successful students should be able to:

- **d1 Make a program of exercise based on the tools he learned in the course.**
- **d2 Describe the outcomes of the course through its use in practical application in different scientific fields.**
- **d3 Explain their own learning and use appropriate learning resources; work both independently and as part of a team.**

3- Contents

Topic	No. of hours	Lecture	Tutorial/Practical
1- Riemann integral **-The concept of the Riemann integral.** **- Functions that are Riemann integrable and examples of unintegrable functions.** **Fundamental theorem of calculus.** **Properties of definite integration**	**5**	**1**	**2**
2-Definite integrations **-Direct integrations** **-integration by substitutions** **-integration of some trigonometric functions** **-Types of real functions** **-Operations on functions and bounded functions** **-sup f(x) and inf f(x)**	**25**	**5**	**10**

-Theorems on continuity and uniform continuity			
3- Indefinite integrations -integration by parts -reduction formulas -Eulers substitutions -integration of irrational -integration of trigonometric and hyperbolic functions -integration of binomial differential Improper integrals	**25**	**5**	**10**
4-Applications on integrations.	**15**	**3**	**6**

4– Teaching and learning methods

4.1- Lectures

4.2- Working on hand in assignments

4.3- Attending practical classes

5- Student assessment methods

5.1 Mid term written exam	**to assess understanding competencies**
5.2 Oral Exam	**to assess attendance and interesting.**
5.3 Semester hand in assignments	**to assess understanding professionalism.**
5.4 Final term written Exam	**to assess comprehension.**

Assessment schedule

Assessment 1	**Mid term**	**Week 7**
Assessment 2	**semester activities**	**Week 5 and 8**
Assessment 3	**Final term oral exam**	**Week 13**
Assessment 4	**final term written exam**	**Week 14**

Weighting of assessments

Mid-Term Examination	**20%**
Semester Work (homework assignments + oral tests)	**20%**
Other types of assessment	**00%**
Final-term written Examination	**60%**
Total	**100%**

Any formative only assessments

6- List of references

6.1 Course notes

Collected and prepared notes that cover the main topics in the course content

6.2 Essential books (text books)

Calculus , Swoleowski, Olinick and Pence, 1993

6.3 Recommended books

1-T.M.Apostol,Mathematical Analysis,Reading,Mass:Addison-Wesley,1957

2-W.Rudin,Priciples of Mathematical Analysis,2nd edition, New York:McGraw-Hill 1964

6.4 Periodicals, Web sites, … etc

None.

7- Facilities required for teaching and learning

None

Course coordinator: Prof. Mohamed A. Ramadan

Head of Department: Prof. Mohamed A. Ramadan

Date: / /