



# Course Specification

— (Bachelor)

**Course Title:** Mathematical Software Packages

**Course Code:** MTH1201

**Program:** BSc. in Mathematics

**Department:** Mathematics

**College:** Al-Qunfudah University College

**Institution:** Umm Al-Qura University

**Version:** 2

**Last Revision Date:** 17/07/2024



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## A. General information about the course:

### 1. Course Identification

1. Credit hours: ( 4 )

#### 2. Course type

A.  University  College  Department  Track  Others  
 B.  Required  Elective

3. Level/year at which this course is offered: ( 7/3 )

#### 4. Course general Description:

Mathematical software packages deal with the theoretical foundations of information and computation, taking a scientific and practical approach to computation and its applications. Computation is defined as any type of calculation or use of computing technology that follows well-defined models (such as algorithms) in the practice of information processing (which in turn is defined as the use of these models to transform data in computers).

The study of such course involves systematically studying methodical processes to aid in the acquisition, representation, processing, storage, analysis, reading data using different proses etc. This is done by analyzing the feasibility, structure, expression, and mechanization of these processes and how they relate to this information. The main principles and elements for mathematical software packages using different program will be presented. Various analysis of data obtained using them are introduces. Several mathematical problems and solving using different software packages are provided.

5. Pre-requirements for this course (if any):

6. Pre-requirements for this course (if any):

#### 7. Course Main Objective(s):

This module consists of lecturers and associated practical sessions. The first part will focus on basic statistical software packages. The second part will provide an introduction to some modern computational statistical methods and their implementation. Thus, it is considered as a best tool to introduce a range of statistical methods implemented on computers. It gives practice in applying methods and interpreting results from them. Develop the use of computers in the collection, validation, analysis, and presentation of data; and help develop the knowledge and experience necessary to implement statistical computing methods.

Moreover, present, the basic concepts and principals in statistical modelling in a computational



paradigm and introduce a range of data visualization, dimensionality reduction and clustering techniques and their implementation in different software packages and to give practice in applying these methods to a range of different datasets. This course will provide students with principles and methods to the statistical packages and analysis of different data

## 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4	100 %
2	E-learning	0	0
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>	0	0
4	Distance learning	0	0

## 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	36
2.	Laboratory/Studio	0
3.	Field	0
4.	Tutorial	0
5.	Others ( <i>Exam, Quizzes, Activities...</i> )	4
<b>Total</b>		<b>40</b>

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Identify the different methods of entering, importing, and manipulating data with different software packages.	K2	Lecture and Tutorials	Exams, quizzes
1.2	Recognize the environment of the mathematical package and how to use	K3, K5	Lecture and Tutorials	Exams, quizzes





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	it to perform different tasks.			
1.3	Describe the problem and solve it graphically	<i>K1 ,K3</i>	Lecture , Tutorials, Lab	Exams, quizzes, coursework
1.4	Recognize different methods and their application for solving mathematical and statistical problems.	<i>K2, K3</i>	Lecture , Tutorials, Lab	Exams, quizzes, coursework
<b>2.0</b>	<b>Skills</b>			
2.1	Analyzing different types of data using software packages.	<i>S1, S8, S9</i>	Lecture , Tutorials, Lab	Exams, quizzes, coursework
2.2	Solve problems using a range of formats and approaches in basic science.	<i>S2, S4, S8</i>	Lecture , Tutorials, Lab	Exams, quizzes, coursework
2.3	Analyzing real problems and solve them graphically.	<i>S5, S8, S9</i>	Lecture , Tutorials, Lab	Coursework
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	Apply knowledge gained during the course using computer applications.	<i>V2, V4</i>	Lecture/ Individual or group work	Exams, Reports. Discussion
3.2	Use computer and its applications as computational tools	<i>V3, V5</i>	Lecture/ Individual or group work	Exams, Reports. Discussion
3.3	Use the internet to write reports about Mathematical and statistical principles.	<i>V4, V5</i>	Lecture/ Individual or group work	Exams, Reports. Discussion
3.4	Apply scientific models and tools effectively.	<i>V3, V5</i>	Lecture/ Individual or group work	Exams, Reports. Discussion

### C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to different programming software.	4
2.	Dealing with different mathematical problems using such programming software.	4
3.	Entering and analyzing data using different programming software.	4
4.	Visualizing data using different software packages.	4
5.	Describe the data using statistical measures	4
6.	Work with different probability distributions	8
7.	Statistical inference using software packages.	8
8.	Use presented software packages for fitting and estimation of model parameters and analysis of variance for identification of significant effects	40





Total

40

## D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm exam	6th	30 %
2.	Quizzes and homework's	During semester	20 %
3.	Final exam	End of semester	50 %

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

Essential References	<ul style="list-style-type: none"> <li>Gareth, J., Daniela, W., Trevor, H., &amp; Robert, T. (2013). An introduction to statistical learning: with applications in R. Springer.</li> <li>Landau, S. and Everitt, B.S., 2003. A handbook of statistical analyses using SPSS. Chapman and Hall/CRC</li> </ul>
Supportive References	Using SPSS to Understand Research and Data Analysis (Electronic Lecture Notes) <a href="http://www.tutorialspoint.com">www.tutorialspoint.com</a> (Electronic Material about R programming)
Electronic Materials	
Other Learning Materials	None

### 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
<b>Technology equipment</b> (projector, smart board, software)	Data Show, Smart Board
<b>Other equipment</b> (depending on the nature of the specialty)	None

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Courses Assessment survey
Effectiveness of		Courses Assessment survey





Assessment Areas/Issues	Assessor	Assessment Methods
Students assessment		
Quality of learning resources	Students	Courses Assessment survey
The extent to which CLOs have been achieved	Faculty Member	Post-Rubric and Course report
Periodically reviewing course effectiveness and planning for improvement	Course committee	Annual report

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

### G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	Curriculum Committees
<b>REFERENCE NO.</b>	1
<b>DATE</b>	17/07/2024

