|  |  |
| --- | --- |
| **Course Title:**  | Computer Applications in Chemistry |
| **Course Code:** | CHEM 310 |
| **Program:** | Bachelor of Science in Chemistry |
| **Department:**  | Chemistry |
| **College:** | Science |
| **Institution:** | King Saud University |

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# A. Course Identification

|  |  |
| --- | --- |
| **1. Credit hours:** | 2(2+0+0) |
| **2. Course type** |
| **a.** | University  |  | College |  | Department | x | Others |  |  |
| **b.** | Required |  | Elective | x |  |
| **3. Level/year at which this course is offered:** | Elective |
| **4. Pre-requisites for this course** (if any)**:** |
| **5. Co-requisites for this course** (if any)**:** |
|  |

## 6. Mode of Instruction (mark all that apply)

| **No** | **Mode of Instruction** | **Contact Hours** | **Percentage**  |
| --- | --- | --- | --- |
| **1** | **Traditional classroom** | 26 | 100% |
| **2** | **Blended**  |  |  |
| **3** | **E-learning** |  |  |
| **4** | **Correspondence** |  |  |
| **5** | **Other**  |  |  |

**7. Actual Learning Hours** (based on academic semester)

|  |  |  |
| --- | --- | --- |
| **No** | **Activity** | **Learning Hours** |
| **Contact Hours** |
| **1** | **Lecture** | 26 |
| **2** | **Laboratory/Studio** |  |
| **3** | **Tutorial**  |  |
| **4** | **Others** (specify) |  |
|  | **Total** | 26 |
| **Other Learning Hours\*** |
| **1** | **Study**  | 10 |
| **2** | **Assignments** | 20 |
| **3** | **Library** |  |
| **4** | **Projects/Research Essays/Theses**  |  |
| **5** | **Others** (specify) Recitation |  |
|  | **Total** | 30 |

**\*** The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

# B. Course Objectives and Learning Outcomes

|  |
| --- |
| 1. Course Description This course aims at enabling students from conducting mathematical calculations using Microsoft Excel. The course will discuss the program's instructions and basic concepts, as well as hands-on training weekly exercises taken from chemistry using Excel software on computers. Through which students learn about the many ways in which Excel can be used as a calculator and an analytical tool for scientific problems and exercises in chemistry. |
| 2. Course Main Objective |
| The main objective of this course is to teach students how EXCEL can be used to process analyze, and present scientific data. This aim is achieved via numerous examples of how a spreadsheet package can be used in chemical experiments. |

# 3. Course Learning Outcomes

| **CLOs** | **Aligned****PLOs** |
| --- | --- |
| **1** | **Knowledge:** |  |
| 1.1 | Learn how to create and save a workbook. | K2 |
| 1.2 | Navigate in worksheets and workbooks. | K1 |
| 1.3 | Learn how to set up data in a table format. | K2 |
| 1.4 | Learn how to enter and edit data in a worksheet. | K2 |
| 1.5 | Learn how to insert formulas in a worksheet. | K2 |
| 1.6 | Learn how choose the appropriate chart format to present your data. | K2 |
| **2** | **Skills :** |  |
| 2.1 | Format worksheets and workbooks. | S2 |
| 2.2 | Carry out statistical analysis of scientific data. | S2 |
| 2.3 | Create a new chart. | S2 |
| 2.4 | Modify chart elements. | S2 |
| 2.5 | Applying conditional formatting to cells. | S2 |
| 2.6 | Prepare a document for printing. | S2 |
| **3** | **Competence:** |  |
| 3.1 | Communicate the results of scientific work in electronic formats. | C4 |
| 3.2 | Technical Mastery of fundamental of Excel skills to succeed in a quantitative analysis course. | C2 |

# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | Introduction to Excel: Purpose and Overview | 3 |
| 2 | Functions and Formulas | 3 |
| 3 | Statistical Analysis with Excel | 3 |
| 4 | Graphing and Linear Regression | 3 |
| 5 | Graphing: Adding a secondary axis in a chart in Excel | 3 |
| 6 | Graphing: Different types of charts | 3 |
| 7 | Graphing: IF function and Breaking Axis in a Chart | 4 |
| 8 | 3-D Graphing in Excel | 4 |
| **Total** | 26 |

# D. Teaching and Assessment

## 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| **Code** | **Course Learning Outcomes** | **Teaching Strategies** | **Assessment Methods** |
| --- | --- | --- | --- |
| **1.0** | **Knowledge** |
| 1.1 | Learn how to create and save a workbook. | Regular lectures in a classroom equipped with data show system, 17 Personal Computer (PC), and connection to the internetWeb conferencing | Assignments Final Exam |
| 1.2 | Navigate in worksheets and workbooks. |
| 1.3 | Learn how to setting up data in a table format. |
| 1.4 | Learn how to enter and edit data in a worksheet. |
| 1.5 | Learn how to insert formulas. |
| 1.6 | Learn how choose the appropriate format and chart to clearly communicate scientific data. |
| **2.0** | **Skills** |
| 2.1 | Format worksheets and workbooks | Regular lectures in a classroom equipped with data show system, 17 Personal Computer (PC), and connection to the internetWeb conferencing | Assignments Final Exam |
| 2.2 | Carry out statistical analysis of scientific data. |
| 2.3 | Create a new chart |
| 2.4 | Modify chart elements |
| 2.5 | Applying conditional formatting to cells. |
| 2.6 | Prepare a document for printing. |
| **3.0** | **Competence** |
| 3.1 | Communicate the results of scientific work in electronic formats. | Regular lectures in a classroom equipped with data show system, 17 Personal Computer (PC), and connection to the internetWeb conferencing | Assignments Final Exam |
| 3.2 | Technical Mastery of fundamental of Excel skills to succeed in a quantitative analysis course. |

## 2. Assessment Tasks for Students

| **#** | **Assessment task\***  | **Week Due** | **Percentage of Total Assessment Score** |
| --- | --- | --- | --- |
| 1 | Assignments  | Weekly | 80% |
| 4 | Final Exam | 16 | 20% |

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

# E. Student Academic Counseling and Support

|  |
| --- |
| **Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :** |
| 1. Office hours (5 hrs/week) and web conferencing. |

# F. Learning Resources and Facilities

## 1.Learning Resources

|  |  |
| --- | --- |
| **Required Textbooks** |  |
| **Essential References Materials** | *Excel for Chemists: A Comprehensive Guide* by E. Joseph Billo  |
| **Electronic Materials** |  |
| **Other Learning Materials** |  |

## 2. Facilities Required

| **Item** | **Resources** |
| --- | --- |
| **Accommodation**(Classrooms, laboratories, demonstration rooms/labs, etc.) | Regular classroom  |
| **Technology Resources** (AV, data show, Smart Board, software, etc.) | Smart board and connection to the internet |
| **Other Resources** (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | 17 Personal Computer (PC) |

# G. Course Quality Evaluation

| **Evaluation****Areas/Issues**  | **Evaluators**  | **Evaluation Methods** |
| --- | --- | --- |
| * Effectiveness of teaching and assessment.
* Extent of achievement of course learning outcomes.
* Quality of learning resources.
 | * Colleagues and staff
* Departmental council
 | Periodical department revisions on methods of teaching and course content by experts on the teaching. |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

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

**Assessment Methods** (Direct, Indirect)

# H. Specification Approval Data

|  |  |
| --- | --- |
| **Council / Committee** |  |
| **Reference No.** |  |
| **Date** |  |