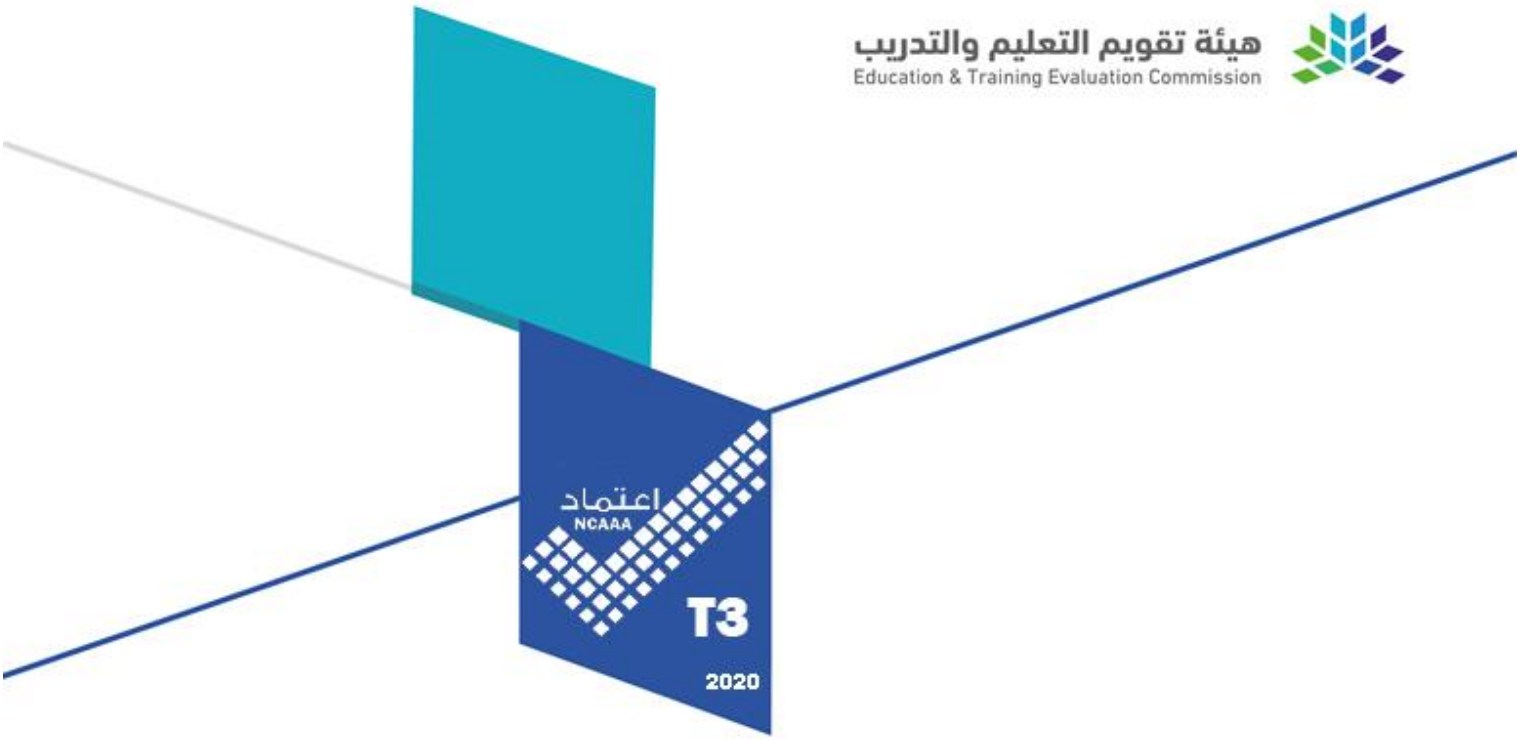
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission




# Program Specification

| |
|---|
| **Program Name:** Bachelor of Science in Applied Mathematics |
| **Qualification Level:** 6 |
| **Department:** Mathematics and Statistics |
| **College:** Science |
| **Institution:** Imam Mohammad Ibn Saud Islamic University |

## A. Program Identification and General Information

**1. Program Main Location:**

**Main Campus for the Male Section.**

**2. Branches Offering the Program:**

***Branch* 1. King Abdullah City for the Female Section.**

**3. Reasons for Establishing the Program:**
(Economic, social, cultural, and technological reasons, and national needs and development, etc.)

**Mathematics plays a critical role in our efforts to understand the nature of the physical universe and in the continuing development of our technological society. There is also a long tradition that recognizes the value of mathematics for its aesthetic appeal to the human spirit. Many students decide to study mathematics for one or both of these reasons. Students also study mathematics in order to develop critical reasoning skills that can significantly contribute to many personal goals. Of course, the study of mathematics can lead directly to interesting employment opportunities in the mathematical sciences and to future study in graduate school. Within the last few years, the frenetic pace of research and development in computers and high technology has led to strong new imperatives for more mathematical expertise, and the need to nurture a new generation of mathematically competent men and women has never been more crucial for the development of our kingdom. For these reasons, TODAY, there is a growing demand of teachers and researchers in mathematics who are able to combine between Mathematics and other disciplines.**

**4. Total Credit Hours for Completing the Program: (174 Credit Hours)**

**5. Professional Occupations/Jobs:**

- **121117 Statistician Manager.**
- **134906 Manager of Weather Forecasting and Environment Control Station.**
- **211102 Astronomy Specialist.**
- **211201 Weather Forecasting Specialist.**
- **212003 Statistician.**
- **232001 Professional Trainer.**
- **331404 Statistician Assistant.**

**7. Intermediate Exit Points/Awarded Degree** (if any)**: Yes**

| Intermediate exit points/awarded degree | Credit hours |
|---|---|
| **Diploma of Science in Mathematics** | **87** |

**Exit Point Professional Occupations/Jobs**

- **412001 Administrative Assistant.**
- **335101 Ports Inspector.**

## B. Mission, Goals, and Learning Outcomes

**1. Program Mission:**

**The mission of the undergraduate program in Applied Mathematics is to prepare students for participating in the economic and social development of the Kingdom of Saudi Arabia, and leading innovation in higher education in the field of Mathematics and its applications.**

**2. Program Goals:**

**G1. Exhibit positive attitudes and national and institutional values toward the applied mathematics, in order to contribute to an increasingly dynamic society.**
**G2. Think critically, master problem-solving skills and communicate clearly applied mathematics concepts and their impact to solve real-life problems.**
**G3. Maintain an essence of mathematical knowledge in line with technological changes to provide a solid foundation for lifelong learning in the future.**
**G4. Have an appropriate package of professional skills to ensure a productive career that uses mathematics.**
**G5. Develop the creative potential of the students through research.**

**4. Graduate Attributes:**

1. **Competent and well-equipped instructors to teach mathematics in college;**
2. **Prepared for mathematics-oriented career in industry, business and public administration; and**
3. **Having the foundation for further research for a career as a research mathematician in a whole range of application areas.**

## C. Curriculum

### 1. Curriculum Structure

| Program Structure | Required/ Elective | No. of courses | Credit Hours | Percentage |
|---|---|---|---|---|
| **Institution Requirements** | Required | ١ | ٢ | **1.1%** |
| | Elective | ٩ | ١٨ | **10.3%** |
| **College Requirements** | Required | **5** | **21** | **12.1%** |
| | Elective | **0** | **0** | **0%** |
| **Program Requirements** | Required | ٢٥ | **111** | **63.8%** |
| | Elective | **2** | **8** | **4.7%** |
| **Capstone Course/Project** | Required | **1** | **4** | **2.3%** |
| **Field Experience/ Internship** | Required | **1** | **4** | **2.3%** |
| **Others** | Required | **3** | **6** | **3.4%** |
| **Total** | | **44** | **174** | **100%** |

### 2. Program Study Plan

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite / Co-Requiste Courses | Credit Hours | Type of requirements (Institution, College or Department) |
|---|---|---|---|---|---|---|
| **Level 1** | MAT ١101 | Calculus (1) | Required | None | ٥ | College |
| | PHY ١101 | General Physics (1) | Required | None | ٥ | College |
| | ENG 1140 | English 1 | Required | None | 3 | College |
| | | University Requirement 1 | Elective | None | 2 | Institution |
| **Level 2** | MAT 1102 | Calculus (2) | Required | MAT 101 | 5 | Department |
| | CHM 1101 | General Chemistry (1) | Required | None | 5 | College |
| | ENG 1195 | English 2 | Required | None | 3 | College |
| | | University Requirement 2 | Elective | None | 2 | Institution |
| **Level** 3 | MAT 1151 | Foundation of Mathematics | Required | None | 5 | Department |
| | STA 1101 | Probability & Statistics (1) | Required | MAT 1102 | 4 | Department |
| | PHY 102 | General Physics (2) | Required | PHY 101 | 4 | Program |
| | | University Requirement 3 | Elective | None | 2 | Institution |
| **Level 4** | MAT 1203 | Calculus (3) | Required | MAT 102 | 5 | Program |
| | MAT 1223 | Linear Algebra | Required | MAT 151 | 5 | Department |
| | MAT 1241 | Math Software | Required | MAT 101 | 3 | Department |
| | | University Requirement 4 | Elective | | 2 | Institution |
| **Level 5** | STA 1202 | Probability & Statistics (2) | Required | MAT 1203, STA 1101 | 5 | Department |
| | MAT 1231 | Introduction to Diff. Equations | Required | MAT 1102, MAT 1223 | 5 | Program |

| Level | Course Code | Course Title | Required or Elective | Pre-Requisite / Co-Requiste Courses | Credit Hours | Type of requirements (Institution, College or Department) |
|---|---|---|---|---|---|---|
| | CS 1249 | Computer Program. for Science | Required | MAT 1241 | 4 | Department |
| Level 6 | MAT 1225 | Introduction to Number Theory | Required | MAT 1151 | 3 | Program |
| | MAT 1253 | Introduction to Operations Research | Required | MAT 1223 | 4 | Program |
| | | Free Course 1* | Elective | None | 2 | Institution |
| | QUR 1001 | University Requirement 5 - Quran | Required | | 2 | Institution |
| | | University Requirement 6 | Elective | | 2 | Institution |
| Level 7 | MAT 1311 | Real Analysis | Required | MAT 1203 | 4 | Program |
| | MAT 1332 | Mathematical Methods | Required | MAT 1203, MAT 1231 | 5 | Program |
| | ECO 1100 | Principles of Economics | Required | None | 3 | Department |
| | | Free Course 2* | Elective | | | Institution |
| Level 8 | MAT 1321 | Modern Algebra | Required | MAT 1223, MAT 1225 | 5 | Program |
| | MAT 1341 | Numerical Analysis (1) | Required | MAT 1231, CS 1249 | 5 | Program |
| | MAT 1371 | Financial Mathematics | Required | MAT 102 | 4 | Program |
| Level 9 | MAT 1334 | Introduction to Partial Differential Equations | Required | MAT 332 | 5 | Program |
| | MAT 1353 | Combinatorics and Graphs | Required | MAT 1102, MAT 1223 | 4 | Department |
| | | Elective Course (1) | Elective | Upon specifying the course | 4 | Program |
| | | Free Course 3* | Elective | | | Institution |
| Level 10 | MAT 1412 | Complex Variables | Required | MAT 1311 | 5 | Program |
| | MAT 1442 | Numerical Analysis (2) | Required | MAT 1341, MAT 1334 | 4 | Program |
| | MAT 1461 | Introduction to Cryptography and Coding | Required | MAT 1321 | 4 | Program |
| | | University Requirement 7 | Elective | None | 2 | Institution |
| Level 11 | MAT 1415 | Introduction to Topology | Required | MAT 1311 | 5 | Program |
| | MAT 1463 | Modeling and Simulation | Required | MAT 1334 | 4 | Program |
| | | Elective Course (2) | Elective | Upon specifying the course | 4 | Program |
| | | University Requirement 8 | Elective | None | 2 | Institution |
| Level 12 | MAT 1497 | Training | Required | | 4 | Program |
| | MAT 1499 | Research Project | Required | | 4 | Program |
| | | University Requirement 9 | Elective | None | 2 | Institution |
| | | University Requirement 10 | Elective | None | 2 | Institution |

* The total hours of the free courses are (6) hours, which are mandatory to finish the program.

## LIST OF ELECTIVE COURSES

| Course Code | Course Name | Credit Hours | Prerequisites |
|---|---|---|---|
| MAT 1444 | **Introduction to Numerical Optimization** | 3 | MAT 1253 MAT 1341 |
| MAT 1465 | **Discrete Simulation** | 3 | STA 202 |
| MAT 1472 | **Financial Mathematics (2)** | 3 | MAT 1371 |
| MAT 1474 | **Actuarial Mathematics** | 3 | MAT 1371 |
| MAT 1382 | **Advanced Euclidean Geometry** | 3 | MAT 1223 |
| MAT 1384 | **Introduction to Differential Geometry** | 3 | MAT 1203 MAT 1223 |
| MAT 1491 | **Selected Topics in Applied Mathematics (1)** | 4 | |
| MAT 1493 | **Selected Topics in Applied Mathematics (2)** | 4 | |
| STA 1203 | **Mathematical Statistics** | 4 | STA 1202 |
| STA 1321 | **Introduction to Regression** | 4 | STA 1202 |
| STA 1351 | **Introduction to Stochastic Processes** | 4 | STA 1202, MAT 1223 |
| ME 1222 | **Fluid Mechanics** | 4 | MAT 1334 |
| PHY 1250 | **Modern Physics** | 4 | MAT 1102 |
| PHY 1312 | **Quantum Mechanics (1)** | 4 | PHY 1102 |
| CS 1449 | **Oriented Object Programming** | 4 | CS 1249 |

## University Requirements courses from (1) to (10)

**University Requirements courses (1)-(10) should be chosen from the following packages and the following the appropriate rules indicated inside the table:**

| *Packages* | *Course Code* | *Course Name* | *Credit Hours* | *Rules* |
|---|---|---|---|---|
| Islamic knowledge and values | QUR 1001 | Quran | 2 | The student chooses two courses, one of which should be the Quran course. |
| | HAD 1001 | Studies in the Sunnah | 2 | |
| | JRS 1001 | Objectives of Shariah | 2 | |

| *Packages* | *Course Code* | *Course Name* | *Credit Hours* | *Rules* |
|---|---|---|---|---|
| | IDE 1001 | Creed | 2 | |
| | JR 1001 | Jurisprudence of Worship and Family | 2 | |
| Historical, national, and social knowledge and values | HST 1001 | Studies in the Prophet's biography | 2 | The student chooses two courses. |
| | HST 1002 | National History | 2 | |
| | SOS 101 | Voluntary Work Skills | 2 | |
| | CUL 1001 CIS 101 | Jurisprudence of Rights and Duties | 2 | |
| | GEO 1011 | Environment and Sustainable Growth | 2 | |
| Professional skills and labor market | RHB 1001 | Work Value and Ethics | 2 | The student chooses two courses. |
| | BUS 1001 | Innovation and Entrepreneurship | 2 | |
| | EDM 1001 | Leadership Skills | 2 | |
| | FIN 1001 | Financial Planning Skills | 2 | |
| | ENG 1001 | English Language Skills | 2 | |
| Communicative and personal skills | BC 1001 | Communications Skills | 2 | The student chooses two courses. |
| | ARB 1001 | Linguistic Skills | 2 | |
| | ART 1001 | Editing and Speech Skills | 2 | |
| | PSY 1001 | Mental Health | 2 | |
| | BIO 1001 | General Knowledge of Health Care | 2 | |
| Academic skills | TCM 1001 | University Education Skills | 2 | The student chooses two courses. |
| | RHE 1001 | Reading Skills | 2 | |
| | IT 1001 | Technical Skills | 2 | |
| | EDP 1001 | Thinking Skills | 2 | |
| | STA 1001 | Basics of Statistics | 2 | |