



Course Specifications

| | | |
|----------------------|--|--|
| Course Title: | Differential Equations | |
| Course Code: | MATH 223 | |
| Program: | Computer Science | |
| Department: | Basic Sciences and Humanities | |
| College: | College of Computer and Information Sciences | |
| Institution: | Majmaah University | |



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A. Course Identification

| |
|--|
| 1. Credit hours: |
| 2. Course type |
| a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/> |
| b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> |
| 3. Level/year at which this course is offered: Level 5 |
| 4. Pre-requisites for this course (if any): MH123 |
| 5. Co-requisites for this course (if any): N/A |

6. Mode of Instruction (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|----|-----------------------|---------------|------------|
| 1 | Traditional classroom | 44 | 100% |
| 2 | Blended | | |
| 3 | E-learning | | |
| 4 | Distance learning | | |
| 5 | Other | | |

7. Contact Hours (based on academic semester)

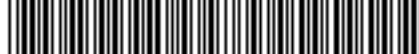
| No | Activity | Contact Hours |
|----|-------------------|---------------|
| 1 | Lecture | 33 |
| 2 | Laboratory/Studio | |
| 3 | Tutorial | 11 |
| 4 | Others (specify) | |
| | Total | 44 |

B. Course Objectives and Learning Outcomes

| |
|---------------------------------|
| 1. Course Description |
| 2. Course Main Objective |

3. Course Learning Outcomes

| | CLOs | Aligned PLOs |
|------|-----------------------------|--------------|
| 1 | Knowledge and Understanding | |
| 1.1 | | |
| 1.2 | | |
| 1.3 | | |
| 1... | | |



| CLOs | | Aligned PLOs |
|----------|--|--------------|
| 2 | Skills : | |
| 2.1 | CLO1- Discriminate differential equation and its order | S5 |
| 2.2 | CLO2- Solve first-order differential equations | S5 |
| 2.3 | CLO3- Solve higher order differential equations | S5 |
| 2.4 | CLO4- Use mathematical modeling to solve some applicable problems by differential equations methods. | S5 |
| 3 | Values: | |
| 3.1 | | |
| 3.2 | | |
| 3.3 | | |
| 3... | | |

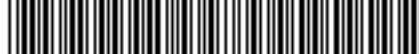
C. Course Content

| No | List of Topics | Contact Hours |
|--------------|---|---------------|
| 1 | Introduction to differential Equations. First order Differential Equations | 4 |
| 2 | Separable differential Equations, Linear differential equations, | 3 |
| 3 | Exact differential Equations, Bernoulli and Riccati Differential Equations. | 3 |
| 4 | Higher order differential Equations: Principle of superposition, the Wronskian | 4 |
| 5 | Homogeneous differential equations with constant coefficients. Reduction of order method | 3 |
| 6 | Undetermined coefficients method, Variation of parameters method | 3 |
| 7 | Mathematical Modeling- Population Growth and decay | 3 |
| 8 | radioactive isotope and carbon dating, Chemical mixtures. RL- electrical series circuits, | 3 |
| 9 | Newton's law of cooling and computing time of death, Drug distribution in human body | 2 |
| 10 | Banking loans and money investment, | 2 |
| 11 | Mathematical Modeling- Higher order Equations | 4 |
| 12 | Vibrating springs and pendulum | 2 |
| 13 | Damped vibration motion | 3 |
| 14 | LRC- electrical series circuits | 3 |
| 15 | Motion of particles in space.A319 | 2 |
| Total | | 44 |

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 and Understanding | | |
| 1.1 | | | |
| 1.2 | | | |
| ... | | | |
| 2.0 | Skills | | |
| 2.1 | CLO-1 Discriminate differential equation and its order | Classroom Teaching | Quizzes Mid Exam |



| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------|--|---------------------|--|
| | | | Assignments Class Test Final Exam |
| 2.2 | CLO-2 Solve first-order differential equations | Classroom Teaching | Quizzes Mid Exam Assignments Class Test Final Exam |
| 2.3 | CLO-3 Solve higher order differential equations | Classroom Teaching | Quizzes Mid Exam Assignments Class Test Final Exam |
| 2.4 | CLO-4 Use mathematical modeling to solve some applicable problems by differential equations methods. | Classroom Teaching | Quizzes Mid Exam Assignments Class Test Final Exam |
| 3.0 | Values | | |
| 3.1 | | | |
| 3.2 | | | |
| ... | | | |

2. Assessment Tasks for Students

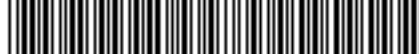
| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|---------------------|-----------|--------------------------------------|
| 1 | Quizzes | 3,7,11 | 20% |
| 2 | Assignments | 3,6,9,11 | 15% |
| 3 | Mid Term Exam | 8 | 20% |
| 4 | Class Participation | All weeks | 5% |
| 5 | Final Exam | 12 | 40% |
| 6 | | | |
| 7 | | | |
| 8 | | | |

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

E. Student Academic Counseling and Support

Arrangements for the availability of faculty and teaching staff for individual student consultations and academic advice :

- Each student is allotted to an academic advisor for guidance and counseling.
- Available for a minimum of 2 hours per week/course, as communicated to the students.
- Student also contacts through social networking websites / Blackboard/ Email for advice and consultations



F. Learning Resources and Facilities

1. Learning Resources

| | |
|---------------------------------------|---|
| Required Textbooks | Differential Equations with Boundary Value Problems Dennis G.ZILL and Warren S. Wright Brooks/ Cole Cengage learning USA, Year – 2012;Edition -10 ISBN:1111827060 |
| Essential References Materials | |
| Electronic Materials | |
| Other Learning Materials | |

2. Facilities Required

| Item | Resources |
|--|------------------------|
| Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) | Classroom |
| Technology Resources (AV, data show, Smart Board, software, etc.) | Smart Board, Projector |
| Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | Internet Connection |

G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|--|----------------------|--------------------|
| Final Exam Answer Scripts Verification | Peer faculty members | Review |
| Course Feedback | Students | Survey |
| | | |
| | | |
| | | |
| | | |

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 | Dr. Ahmed Farghaly |
| Reference No. | |
| Date | 18 September fall 2022 |