**TEMPLATE FOR COURSE SPECIFICATION**

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| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

**COURSE SPECIFICATION**

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| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification. |

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| Al- Mansour University College | 1. Teaching Institution |
| Communication Department | 2. University Department/Centre |
| Numerical Methods | 3. Course title/code |
|  | 4. Programme(s) to which it contributes |
| Weekly – Lectures | 5. Modes of Attendance offered |
| 2022 – 2023 (Second Semester) | 6. Semester/Year |
| 60 Hours (Theory and Lab.) | 7. Number of hours tuition (total) |
| 8-2-2023 | 8. Date of production/revision of this specification |
| 9. Aims of the Course | |
| Introducing the different numerical analysis methods used in solving multiple problems in mathematics, and this matter has two directions, theoretical and practical, where students are able to write computer programs for the purpose of solving different mathematical problems using numerical methods. | |

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| 10· Learning Outcomes, Teaching ,Learning and Assessment Methode |
| 1. Knowledge and Understanding   A1. Learn about numerical analysis in general.  A2- Learn a variety of numerical methods for solving different problems in mathematics.  A3- Linking theoretical knowledge with the practical aspect.  A4- Identifying the necessary software algorithms to transform the theoretical side into an application. |
| B. Subject-specific skills  B1 Training the student to deal with different sports situations.  B2 - Training the student on programming and implementing relevant algorithms. |
| Teaching and Learning Methods |
| 1- Theoretical lectures with solving various practical examples.  2- Homework.  3- Program applications in Lab. |
| Assessment methods |
| 1- Assessment of class exercises  2- Evaluation of extra-curricular exercises  3- Semester exams |
| C. Thinking Skills  C1. Training students on the behavior of the scientific approach in investigation and research.  C2 - Training students on scientific reasoning about dealing with different issues and situations. |
| Teaching and Learning Methods |
| Theoretical lectures with related seminars. |

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| D. General and Transferable Skills (other skills relevant to employability and personal development)  D1. Enable the student to know the subject of numerical analysis in its theoretical and practical branches and link the two branches with each other.  D2 - Enable the student to obey the foundations he has received in order to be able to apply them in different aspects of life. |

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| 11. Course Structure | | | | | |
| Assessment Method | Teaching  Method | Unit/Module or Topic Title | ILOs | Hours | Week |
| Exam and assessment | Theoretical and lab. Lectures | Trapezoidal and Simpson Rules | Integration | 4 | 1-2 |
| Exam and assessment | Theoretical and lab. Lectures | Forward and central formula | Differentiation | 4 | 3-4 |
| Exam and assessment | Theoretical and lab. Lectures | Lagrange and Newton Interpolation | Interpolation | 4 | 5-6 |
| Exam and assessment | Theoretical and lab. Lectures | Direct Methods | Linear equations | 4 | 7-8 |
| Exam and assessment | Theoretical and lab. Lectures | Iterative Methods | Linear equations | 4 | 9-10 |
| Exam and assessment | Theoretical and lab. Lectures | Bisection Method | Roots of equations | 4 | 11-12 |
| Exam and assessment | Theoretical and lab. Lectures | Newton- Raphson Method | Roots of equations | 4 | 13-14 |
| Exam and assessment | Theoretical and lab. Lectures | Euler Method | Differential Equations | 2 | 15 |

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| 12. Infrastructure | |
| Numerical methods. By: Robert W. Hornbeck.  Numerical methods for math. science, and eng. By: John H. Mathews. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER |