**Course-Program Mapping**

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| **Date:** | Fall2019 | **Department:** | Computer Science and Engineering |
| **Course Title:** | Differential and Integral Calculus | **Prepared by:** | Satyaki Das |
| **Course Code:** | MAT 101 | **Checked by:** |  |
| **Course Type:** | MJ, T |  |  |

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| **SL No.** | **Course Learning Outcome (ILO)** | **Contribution to** | | | **Assessment Strategy** |
| **Program Learning Outcomes** | **Generic Skills** | **Professional Skills** |
| **1.** | **Describe** the objective of Differential and Integral Calculus | PLO1(MJ) | GS1.1(MJ), GS3.4(MJ) | PS1(MJ), PS2 (MN) | AS1(MJ), AS7(MJ) |
| **2.** | **Explain** terms related to various techniques of differentiation and integration, design mathematical modeling of different applications | PLO1(MJ), PLO2 (MJ) | GS2.1(MJ), GS3.4 (MN) | PS1(MJ), PS2 (MJ) | AS1(MJ), AS7(MJ) |
| **3.** | **Understand** a practical problem; **apply** techniques and appropriate formulation to implement method to solve the problem. | PLO1 (MJ), PLO2 (MJ), PLO3 (MJ) | GS1.1(MJ), GS4.2(MJ), GS4.3 (MJ), GS3.7(MN) | PS1 (MJ), PS2 (MJ), PS6(MJ) | AS1(MJ), AS2(MJ), AS7(MJ) |

**Note:** Kindly write the appropriate code on the space allotted. Please indicate if the contribution is major (MJ) or minor (MN). The codes are in the following pages.

**Legend:**

**Program Learning Outcomes**

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| **Code** | **Full Description** |
| **PLO 1** | **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems; |
| **PLO 2** | **Problem Analysis (T)** – Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences; |
| **PLO 3** | **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues. |
| **PLO 4** | **Investigation (D)** Conduct investigation into complex problems, displaying creativeness, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions; |
| **PLO 5** | **Modern Tool Usage (A & D)** -Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations; |
| **PLO 6** | **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices. |
| **PLO 7** | **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development; |
| **PLO 8** | **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices. |
| **PLO 9** | **Communication (S)** -Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions; |
| **PLO10** | **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings. |
| **PLO11** | **Life Long Learning (S)** -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |
| **PLO12** | **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one’s own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities of entrepreneurship. |

**Generic Skills**

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| **Code** | **Full Description** |
| **GS 1.1** | **Knowledge:** IT Knowledge |
| **GS 1.2** | **Knowledge:** Innovative Knowledge |
| **GS 2.1** | **Communication:** Oral Communication |
| **GS 2.2** | **Communication:** Written Communication |
| **GS 2.3** | **Communication:** Presentation Skills |
| **GS 3.1** | **Interpersonal Skills**: Ability to work in teams |
| **GS 3.2** | **Interpersonal Skills**: Leadership |
| **GS 3.3** | **Interpersonal Skills**: Empathy |
| **GS 3.4** | **Interpersonal Skills**: Motivation ability |
| **GS 3.5** | **Interpersonal Skills**: Reliability |
| **GS 3.6** | **Interpersonal Skills**: Appreciation of ethical values |
| **GS 3.7** | **Interpersonal Skills**: Adaptability |
| **GS 4.1** | **Work Skills**: Time management |
| **GS 4.2** | **Work Skills**: Judgment |
| **GS 4.3** | **Work Skills**: Problem formulation, solving and decision-making skills |
| **GS 4.4** | **Work Skills**: Collecting and analyzing appropriate data |
| **GS 4.5** | **Work Skills**: Discipline |
| **GS 4.6** | **Work Skills**: Sense of responsibility |

**Professional Skills (**depends on department**)**

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| **Code** | **Full Description** |
| **PS 1** | **Engineering Knowledge (T)** -Apply knowledge of mathematics, sciences, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems; |
| **PS 2** | **Problem Analysis (T)** – Identify, formulate, research relevant literature and analyze complex engineering problems, and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences; |
| **PS 3** | **Design/Development of Solutions (A)** –Design solutions, exhibiting innovativeness, for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues. |
| **PS 4** | **Investigation (D)** Conduct investigation into complex problems, displaying creativeness, using research-based knowledge, and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions; |
| **PS 5** | **Modern Tool Usage (A & D)** -Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations; |
| **PS 6** | **The Engineer and Society (ESSE)** -Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices. |
| **PS 7** | **Environment and Sustainability (ESSE)** -Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development; |
| **PS 8** | **Ethics (ESSE)** –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices. |
| **PS 9** | **Communication (S)** -Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions; |
| **PS 10** | **Individual and Team Work (S)** -Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings. |
| **PS 11** | **Life Long Learning (S)** -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |
| **PS 12** | **Project Management and Finance (S)** -Demonstrate knowledge and understanding of engineering management and financial principles and apply these to one’s own work, as a member and/or leader in a team, to manage projects in multidisciplinary settings, and identify opportunities of entrepreneurship. |

**Course Type:**

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| **Code** | **Full Description** |
| **Type A** | |
| **GE** | General education |
| **F** | Foundational |
| **MJ** | Major |
| **MN** | Minor |
| **E** | Elective |
| **I** | Internship |
| **Type B** | |
| **T** | Theoretical |
| **L** | Lab based |
| **P** | Practical |

**Learning Assessment Strategy:**

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| **Code** | **Description** |
| **AS 1** | **Quiz/CT** |
| **AS 2** | **Assignment** |
| **AS 3** | **Presentation** |
| **AS 4** | **Viva** |
| **AS 5** | **Field Work** |
| **AS 6** | **Project** |
| **AS 7** | **Examination** |