**University of Management and Technology**

**School of Science and Technology**

***Department of Physics***

**Course Code:** PH312

**Course Title: Mathematical Methods of Physics-II**

**Program: BS (PHY)**

**Course Outline (Spring Semester 2021)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Schedule** | 5:00-6:15 | **Pre-requisite** | Mathematical Methods of Physics-I | |
| **Course Coordinator** | **Hafiz Arslan Hashim** | **Contact** | **arslan.hashim@umt.edu.pk** | |
| **Course**  **Description** | 1-Complex Analysis  2-Tensor Analysis  3-Group Theory | | | |
| **Expected**  **Outcomes** | At the completion of the course students will be able to make a basic understanding of:   1. Complex numbers and functions appear in Physics 2. Tensor Analysis (applied to differential equations important in physics) 3. Group Theory | | | |
| **Text**  **Book** | 1. Adv. Engineering Mathematics by Dennis Zill 5th Ed. 2. Mathematical methods for physicists, sixth edition,by George B. Arfken, Hans J. Weber. Elsevier academic press, 2005. 3. Mathematical Physics by Eugene Butkov, Addison-Wesley Publishing Company, London, 1973. | | | |
| **Reference Book:** | 1. Mathematical Methods in the Physical Sciences, 3rd edition by Mary L. Boas, Kaye Pace, 2006. 2. Advanced Engineering Mathematics, Ninth edition, Erwin Kreyszig, John Wiley and Sons INC, 2006 | | | |
| **Assignments** | Problems will be assigned at regular intervals as an assignment. | **Quizzes** | | All quizzes will be announced well before time.  No make-ups will be offered for missed quizzes |
| **Mid Term**  **Examination** | A 60-minutes exam will cover all the material covered during the first half of the semester. | **Final**  **Examination** | | A 120-minutes exam will cover all the material covered during the semester. |
| **Attendance**  **Policy** | Students missing more than 20% of the lectures will receive an “SA” grade in the course and will not be allowed to take final exam. | | | |

Department of Physics

**Mathematical Methods of Physics-II** (PH312)

**Lecture Plan (Spring 2021)**

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| --- | --- | --- | --- |
| **Week** | **Lecture**  **#** | **TOPICS** | **Book** |
|  | 1  2 | Functions of a complex variable | Zill |
|  | 1  2 | Functions of a complex variable | Zill |
|  | 1  2 | Integration in the complex plane | Zill |
|  | 1  2 | Integration in the complex plane | Zill |
|  | 1  2 | Series and Residue | Zill |
|  | 1  2 | Series and Residue | Zill |
|  | 1  2 | Curvilinear coordinates | Arfken |
|  | 1  2 | Tensor Analysis and Differential Forms | Arfken |
|  | 1  2 | Tensor Analysis and Differential Forms | Arfken |
|  | 1  2 | Tensor Analysis and Differential Forms | Arfken |
|  | 1  2 | Group Theory | Arfken |
|  | 1  2 | Group Theory | Arfken |
|  | 1  2 | Group Theory | Arfken |
|  | 1  2 | Group Theory | Arfken |
|  | 1  2 | Group Theory | Arfken |