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| Course Code | Course Title | L | P | U |
| MA553 | Calculus of Variation and Integral Equation | 4 | 0 | 4 |

**Scope and objectives of the course :**

This serves a course in calculus in which we will learn the classification of integral equations, various methods for solving Boundary value problems and various methods for solving integral equations.

**Text Books : T1 :** M. Gelfand, S.V. Fomin, Calculus of variations. Prentice-hall inc. Englewood, New jersey. 2015.

**Reference books : R1 :** A.S. Gupta, Calculus of variations with variations.

**Lecture-wise plan**

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| Lecture No. | Learning objective | Topics to be covered | Reference |
| 1 | To introduce the problems which investigate extrema of functional. | Variation of a functional, | T1 |
| 2-4 | To know about different forms of  Euler-Lagrange equation. | Euler-Lagrange equation | T1 |
| 5-10 | Finding extremals of functional. |  |
| 11 | , Necessary and sufficient conditions for extrema. | T1 |
| 12-21 | To learn different methods for solving Boundary Value Problems in ODE and PDE. | Variational methods for boundary value problems in ordinary and partial differential equations. | T1 |
| 22-25 | To learn the classification of integral equation. | Linear integral equation of the first and second kind of Fredholm and Volterra type, |  |
| 26-32 | To learn a method for solving integral equation | Solutions with separable kernels. |  |
| 33-38 | Characteristic numbers and eigen functions, |  |
| 39-45 | resolvent kernel. |  |

**: Evaluation Scheme :**

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| Component | Duration | Weightage(%) | Remarks |
| Internal I | 20 minutes | 10 | Closed Book |
| Mid Term Examination | 2 hours | 30 | Closed Book |
| Internal II | 20 minutes | 10 | Closed Book |
| Comprehensive Examination | 3 hours | 50 | Closed Book |

1. **Attendance Policy :** A student must normally maintain a minimum of **75% attendance** in the course without which he/she will be disqualified from appearing in the respective examination.
2. **Make-up Policy :**  A student, who misses any component of evolution for genuine reasons, must immediately approach the instructor with a request for make-up examination. **The decision of the instructor in all matters of make-up will be final.**
3. **Chamber Consultation Hours :** During the chamber consultation hours, the student can consult the respective faculty in his or her chamber without any prior appointment.