**Course Profile**

**Semester: Spring**

**Year: 2020**

**Level/Term: 4/1**

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| **I. Course Code:** | EEE 422 | | |
| **II. Course Title:** | Measurement and Instrumentation Laboratory | | |
| **III. Credit:** | 1 | **IV. Pre-Requisite:** | EEE 422 |
| **V. Contact Hours:** | Lecture- 2 hours and 10 minutes/week | | |
| **VI. Course Objectives:** | | | |
| The objectives of this course are   * To introduce students with basic process of measuring electrical quantities such as voltage, current, resistance and capacitance. * To familiarize students with advantages, disadvantages and limitations of measurement equipment. * To provide students the knowledge of precision and accuracy of different electrical measurement equipment. | | | |

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| **VII. Course Outcome (COs):** | | | | | | | |
| **Sl. No.** | **COs**  (Upon successful completion of this course, students should be able to) | **Corresponding POs** | **Bloom’s taxonomy domain/level\*** | | | **Delivery Methods & activities** | **Assessment tools** |
| C | A | P |
| CO 422-1 | **Modify** voltmeter range to measure different voltage readings and **explain** its mechanism of operation | PO a,e | 2,3 | - | 3 | Lectures and experiment | Group experiment, Practical exam and quiz |
| CO 422-2 | **Compute** unknown resistance by whetstone bridge and **illustrate** its operation | PO a, b, i | 2,3 | - | 3 | Lectures and experiment | Group experiment, Practical exam and quiz |
| CO 422-3 | **Measure** unknown very high resistance by loss of charge method and **justify**the theoretical equation | PO a, d | 2,6 |  | 6 | Lectures and experiment | Group experiment, Practical exam and quiz |
| CO 422-4 | **Measure** capacitance using 555 timer and **derive** the output equation | PO a, b, e | 1,4 |  | 4 | Lectures and experiment | Group experiment, Practical exam and quiz |
| CO 422-5 | **Construct**full and half wave rectifier, precision rectifier, instrumentation amplifier and **verify** the output equations | PO c, d | 5,6 |  | 5 | Lectures and experiment | Group experiment, Practical exam and quiz |

\* C: Cognitive, P: Psychomotor; A: Affective

**VIII. Course Plan with Detail Description:**

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| --- | --- | --- |
| **Session** | **Contents** | **COs** |
| **Week 1** | * Introduction to measurement and instrumentation. * Study of voltmeter range extension and verify experimentally. | 1 |
| **Week 2** | * Whitestone bridge mechanism of operation and application of Whitestone bridge to measure unknown resistance. | 2 |
| **Week 3** | * Source free RC circuit * Classification of resistance. * Measurement of very high resistance by loss of charge method | 3 |
| **Week 4** | * 555 timer and its different modes of operation * Capacitance measurement by 555 timer | 4 |
| **Week 5** | * A/D and D/A Conversion. | 5 |
| **Week 6** | * Op amps * Precision rectifier | 5 |
| **Week 7** | * Instrumentation amplifier | 5 |
| **Week 8** | * Electric Ohmmeter. | 2 |
| **Week 9** | * Optocoupler, Photodiode and LED | 3 |
| **Week 10** | * Active Low pass Butterworth Filter | 2 |
| **Week 11** | * Universal high Resistance Voltmeter. | 3 |
| **Week 12** | * Voltage Doubler Circuit | 4 |

**VIII. Evaluation Policy:**

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| --- | --- | --- | --- | --- | --- |
| **Marks Distribution:** | |  |  | | --- | --- | | Attendance  Lab Reports  Viva  Quiz | 10%  25%  25%  40% | | **Total** | **100%** | |
| **Grading System:** | As per DIU rule |

**X. Resources:**

Textbook(s):

#### [1]Electrical and Electronic Measurements and Instrumentation– A K.Sawhney

[2] Lab sheets

**XI. Course Link in Google Class Room:**

https://classroom.google.com/c/Mjc0OTkxOTU1NTha

**XII. Course Instructor(s):**

* Name: Md. Tahmidul Alam

Designation: Lecturer

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Room: 506 (MC)

* Name: Arnob Ghosh

Designation: Lecturer

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* Name: Md. Ramjan Ali (MRA)

Designation: Lecturer (Lab)

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Room: 107(AB-03) PC

* Name: M. Nahid Reza

Designation: Lecturer

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**XIII. Approval of the teacher along with sign:**

I/We agree that you may excerpt some of my work to share with other teaching assistants and faculty. The purpose is to assess student learning and to improve teaching. I recognize that every effort will be made to keep this information confidential and that my name will not be associated with my comments.

Signature of the Instructors