| Semester | Course Code | Course Category | Hours/Week | Credits | Marks for Evaluation | | |
|---|---|---|---|---|---|---|---|
| | | | | | CIA | ESE | Total |
| III | 24UPHVAC1 | Value Added Course – I | 30 | - | - | 100 | 100 |

| Course Title | PHYSICS OF DOMESTIC ELECTRICAL APPLIANCES |
|---|---|

| SYLLABUS | | |
|---|---|---|
| Unit | Contents | Hours |
| I | **Iron Box**<br><br>Types – Non-Automatic – Automatic – Construction and Working –Steam Iron Box-Differences between Automatic and Non-Automatic Iron Box. | 6 |
| II | **Water Heater**<br><br>Water Heater – Function – Types – Electric Kettle – Immersion water heater – Construction and working – storage water heaters – pressure type – construction and working. | 6 |
| III | **Mixer**<br><br>Electric Mixer – Function – Construction – General Operating Instruction – Caution – Mixer Cleaning | 6 |
| IV | **Fan**<br><br>Electric Fan – Function – Terminology – Construction and Working of Ceiling &Table Fan –Exhaust Fan | 6 |
| V | **Trouble Shooting -Practicals**<br>General Fault findings and Remedies: Iron box –Water heater-Mixi-Fan | 6 |

| **Text Book(s):** |
|---|
| A. Sumathi, R.Krishnakumar, P. Balasubramanian, K.S. Sampath Nagarajan, Electrical Machines andAppliances, Tamil NaduTextbook Corporation, 2011 |
| **Reference Book(s):** |
| Service Manual-Electrical Home Appliances, GT Publications |
| **Web Resource(s):** |
| https://onlinecourses.swayam2.ac.in/nou23_ge80/preview |

| | **Course Outcomes** | |
|---|---|---|
| Upon successful completion of this course, the student will be able to: | | |
| **CO No.** | **CO Statement** | **Cognitive Level (K-Level)** |
| CO1 | acquire knowledge about the fundamental principles and classification of electrical appliances. | **K1** |
| CO2 | understand the efficiencies of various electrical home appliances. | **K2** |
| CO3 | analyze different working mechanisms of home appliances. | **K3** |
| CO4 | attain the ability to test various electrical home appliances. | **K4** |
| CO5 | be capable of troubleshootingavariety of problems and issues in electric home appliances. | **K5** |

**Course Coordinators:**

Dr. S. Abbas Manthiri

Dr. S. Shek Dhavud

Mr. S. Mohamed  Ibrahim Sulaiman Sait

Dr. C. Hariharan

Dr. L. Umaralikhan

Dr. P. Revathi

Dr. V. Kalyanavalli

| Semester | Course Code | Course Category | Hours/ Week | Credits | Marks for Evaluation | | |
|---|---|---|---|---|---|---|---|
| | | | | | CIA | ESE | Total |
| V | 24UPHVAC2 | Value Added Course – II | 30 | - | - | 100 | 100 |

| Course Title | SENSORS AND THEIR APPLICATIONS |
|---|---|

| SYLLABUS | | |
|---|---|---|
| **Unit** | **Contents** | **Hours** |
| I | **Temperature Sensors** <br><br> Oral thermometer - Indoor/Outdoor Thermometer – Thermocouples–Thermistor - Semiconductor P-N Junction Sensors - Acoustic Temperature Sensor | 6 |
| II | **Pressure Sensors and Light Sensors** <br><br> Piezoresistive Diaphragm - Capacitive Touch Diaphragm - Photoresistor Sensor - Solar Cell – Phototransistors | 6 |
| III | **Position Transducers** <br><br> Potentiometric Sensors - Gravitational Sensors - Capacitive Sensors - Inductive and Magnetic Sensors: LVDT and RVDT - Eddy Current Sensors - Transverse Inductive Sensor | 6 |
| IV | **Optical, Ultrasonic and Radar Sensors** <br><br> Optical Bridge - Proximity Detector with Polarized Light - Ultrasonic Sensors– Micropower Impulse Radar | 6 |
| V | **Thickness, Level Sensors and Accelerometers** <br><br> Ablation Sensors - Liquid-Level Sensors - fuel level gauge - Capacitive Accelerometers - Piezoresistive Accelerometers | 6 |

**Text Book(s):**

1. W. Altmann, "Practical Process Control for Engineers and Technicians", Newens, 2005.
2. J.luecke, "Analog and Digital Circuits for Electronic Control System Applications", Newens, Elsevier Inc, 2005.

**Reference Book(s):**

1. J.s.Wilson,edited,"Sensor Technology Handbook",Newens, Elsevier Inc, 2005.

**Web Resource(s):**

https://www.vbspu.ac.in/e-content/Vishal-Yadav/Sensors.pdf

| | Course Outcomes | |
|---|---|---|
| Upon successful completion of this course, the student will be able to: | | |
| **CO No.** | **CO Statement** | **Cognitive Level (K-Level)** |
| CO1 | understand concepts in common methods for converting a physical parameter into an electricalquantity | **K1** |
| CO2 | explain with examples of transducers, including those for the measurement oftemperature, strain, motion, position, and light | **K2** |
| CO3 | comparing different standards and guidelines to make sensitivemeasurements of physical parameters | **K2&K3** |
| CO4 | categorize the different types of sensors used in real-life applications and paraphrase theirimportance | **K4** |
| CO5 | testing strategies to evaluate performance characteristics of different types ofsensors and transducers | **K5** |

**Course Coordinators:**

Dr. J. Ebenezar

Dr. A. Abbas Manthiri

Dr. A. S. Haja Hameed

Mrs. M. Ayisha

Mrs. M. Shobanambigai

Mrs. G. Pragadeeswari

| Semester | Course Code | Course Category | Hours/ Week | Credits | Marks for Evaluation | | |
|---|---|---|---|---|---|---|---|
| | | | | | CIA | ESE | Total |
| III | 24PPHVAC1 | Value Added Course – I | 30 | - | - | 100 | 100 |

| Course Title | MICRO ELECTRO MECHANICAL SYSTEM (MEMS) |
|---|---|

| SYLLABUS | | |
|---|---|---|
| Unit | Contents | Hours |
| I | **MEMS AND MICROSYSTEMS**<br><br>Introduction Microsystem - Microsystems and Microelectronics - Comparison of Microelectronics and Microsystems – Microsensors: Biomedical Sensors and Biosensors - Chemical Sensors | 6 |
| II | **MICROACTUATION**<br>Actuation using thermal forces, shape memory alloys, piezoelectric crystals, and electrostatic forces–Micromotors – Microvalves - Microaccelerometers | 6 |
| III | **MEMS FABRICATION**<br><br>LIGA Process - Bulk Micromachining - Surface Micromachining - Etching: Wet Etching - Dry Etching -Plasma Etching -Deep Reactive Ion Etching (DRIE) | 6 |
| IV | **MICROSYSTEM DESIGN**<br>Design constraints - Selection of materials - Selection of Manufacturing Process- Signal mapping and transduction - Electromechanical systems | 6 |
| V | **MEMS PACKAGING**<br><br>Ceramic packages - Multilayer packages -Embedded overlay - Wafer-level packaging - Microshielding and Self-packaging | 6 |

| **Text Book(s):** |
|---|
| Nadim Maluf, "An introduction to Microelectro mechanical system design", Artech House, 2000 |
| **Reference Book(s):** |
| Luis Castañer, Understanding MEMS: Principles and Applications, Wiley Publication, Edition 2015 |
| **Web Resource(s):** |
| 1. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SECA3007.pdf<br>2. https://www.wiley.com/en-us/Understanding+MEMS%3A+Principles+and+Applications-p-9781119055495<br>3. https://www.chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://application.wiley-vch.de/vch/journals/2081/books/2081_rel_title_varadan.pdf |

| Course Outcomes | | |
|---|---|---|
| Upon successful completion of this course, the student will be able to: | | |
| **CO No.** | **CO Statement** | **Cognitive Level (K-Level)** |
| CO1 | understand the working principles of MEMS and Microsystem and their application in the medical field. | **K1&K2** |
| CO2 | develop in-depth knowledge in existing or emerging areas of the field of device engineering, circuit design, lithography | **K3** |
| CO3 | analyze the applications such as physical sensors and biomedical systems, | **K4** |
| CO4 | explain and evaluate various MEMS fabrication techniques. | **K5** |
| CO5 | expertise to design, fabricate, test, and package sensors and actuators of micro-scale using conventional semiconductor technologies and other emerging technologies | **K6** |

**Course Coordinator:**

Dr. N. Peer Mohamed Sathik

Dr. R. Radhakrishnan

Major. F. S. Muzammil

Dr. R. Raj Muhamed

Mr. J. Umar Malik

Ms. R. Gowthar