| Akashi Col | | ollege | | Year 2022 | | | | ourse Title | | nced Instru leering | mentation |
|---|--|--|---|--|---|--|---|--|--|--|-----------|
| Course Information | | | | | | | | | | | |
| Course Co | de | 4017 | | | | | ry | Specialized / Elective | | | |
| Class Format | | Lecture | | | | | | Academic Credit: 2 | | | |
| Department Mechanic Engineer | | | | nd Electronic | Student Grade | | Adv. 1st | | | | |
| | | | Semester | | | Classes per We | ek 2 | | | | |
| Textbook Teaching I | | | | | | | | | | | |
| Instructor | | FUJIWAF | RA Se | eiji | | | | | | | |
| Course (| Objectiv | es | | • | | | | | | | |
| The goal is to achieve a comprehensive understanding of each of the following items and to appropriately apply the knowledge learned. (1) Measurement data processing (units and standards, and statistical data processing) (2) Measurement systems analysis and characterization (system evaluation methods and digital signal processing) (3) Various basic measurement principles (basic principles and their applications) | | | | | | | | | | | |
| Rubric | | | | | | 1 | | | | | |
| | | | Ideal Level | | | Standard Level | | | | ceptable Leve | |
| Achieveme | ent 1 | | Understand and can apply measurement data processing (units and standards, and statistical data processing). | | | processing (uni | rstand measurement data essing (units and lards, and statistical data essing). | | | ot understand surement data s and standarc stical data proc | is, and |
| Achieveme | | Understand and can apply measurement systems analysis and characterization (system evaluation methods, and digital signal processing). | | | Understand me systems analys characterization evaluation met signal processing | sis and n (syste hods, a | em | meas and c evalu | ot understand surement syste characterizatio lation methods l processing). | n (system | |
| Achieveme | | Understand and can apply various basic measurement principles (basic principles and their applications). | | | Understand va measurement p principles and t applications). | t principles (basic | | basic (basi | not understanc measurement c principles an cations). | t principles | |
| Assigned | d Depart | ment Ob | ject | ives | | | | | | | |
| Teaching | g Metho | d | | | | | | | | | |
| Recent breakthroughs in technology demand more accurate measurements. In addition, there is an increas need for computer-based measurement automation and online and in-process measurement in production systems. This lecture will Outline 1) briefly review the basic items common to various applied measurements (what is measurement engineering, units and standards, measurement data processing, measurement system characteristics and system analysis, etc.); then 2) discuss in detail the various basic measurement principles (basic principles signal conversion). | | | | | | | | roduction nt ristics and | | | |
| Style | | | | e held in a le | | | | | | | |
| Notice | Notice This course's content will amount to 90 hours of study in total. These hours include the learning time guaranteed in classes and the standard self-study time required for pre-study / review, and completing assignment reports. Students who miss 1/3 or more of classes will not be eligible for a passing grade. | | | | | | | | | time pleting | |
| Characte | eristics o | | | ision in Lea | | <u> </u> | | | | | |
| □ Active | | Aided by ICT | | | □ Applicable to Remote Class | | □ Ir Expe | Instructor Professionally Experienced | | | |
| | | | | | | | | | | | |
| Course I | Plan | | | | | | | | | | |
| | | | Them | ne | | | Goals | | | | |
| | 1st Quarter | 1st | What mear | duction t is metrology ning of measu hing, etc. and | neering Under entation, conc neasurement. | | rstand what metrology is and its basic pts. | | | | |
| 1st Semeste r | | 2nd | Study of SI the b meas | base units a basic methods | andards, and soli nd dimensional ar of measurement tem planning and | nalysis. Study : and | Study u base u | Study units and standards and understand SI base units and dimensional analysis. | | | |
| | | 3rd | Study accur | y measureme racy, identify | ement data error and accuracy neasurement errors and measurement y, identify the causes of errors, and study reduce errors and improve accuracy. | | | Understand measurement errors and accuracy, and how to reduce error. | | | |
| | | 4th | Study data | y the statistic | a statistical procest al processing of r e correct data pro examples. | Understand the statistical processing of measurement data. | | | | | |
| | | 5th | Study analy | leasurement systems and system analysis itudy the basic configuration and characteristic nalysis of measurement systems, and learn bas haracteristic analysis techniques. | | | Understand the basic configuration and characteristic analysis of measurement systems. | | | | |
| | | 6th | Study | echanical sensors (1) cudy mechanical expansion principles (screws, ears, and lever). | | | Understand mechanical extension principles (screws, gears, and lever). | | | | |
| | | | | | | | | | | | |

| Print Mechanical sensors (2) Study the application of elastic deformation to sensors and the measurement of vibration using the seismic system. Understand the application of elastic deformation using the seismic system. 8th Mechanical sensors (3) Study the application of impedance changes, in particular the principle and application of resistance line strain gauges that have extensive range of application of impedance changes induction). Understand the application of impedance changes, in particular the principle and application of resistance line strain gauges that have extensive range of applications. 10th Electric and electronic sensors (2) Study the application of presence changes (changes in capacitance and electromagnetic induction). Understand the application of presence (changes in capacitance and electromagnetic induction). 11th Electric and electronic sensors (3) Study the application of presence (changes in capacitance and electromagnetic induction). Understand the application of presence (changes in capacitance and electromagnetic induction). 11th Electric and electronic sensors (3) Study the application of presence (changes in capacitance and electromagnetic induction). Understand the application of presence (changes in capacitance and electronic sensors. 11th Electric and electronic sensors (3) Study the principle and the principle of an air micrometer. Understand the fluid volume measurement using the fluid principle and the principle of an air micrometer. 12th Fluid type sensor Study the principles and applications of the optical interference a | | | | | | | | |
|--|----------------------------------|-------------|--------|--|-------------------------------|--|-------|--|
| Study the gyro principle and its application. Onderstand the gyro principle and the application. 9th Electric and electronic sensors (1) Study the application of impedance changes, in particular the principle and application of resistance line strain gauges that have extensive range of applications. Understand the application of impedance changes, in particular the principle and application of resistance line strain gauges that have extensive range of applications. 10th Electric and electronic sensors (2) Study the application of piezoelectric and Seebeck (changes in capacitance and electromagnetic induction). Understand the application of piezoelectric and Seebeck effect to sensors. 11th Study the opplication of piezoelectric and Seebeck effect to sensors. Understand the application of piezoelectric and Seebeck effect to sensors. 12th Fluid type sensor Study fluid volume measurement using the fluid principle and the principle of an air micrometer. Understand the fluid volume measurement using the fluid principle and applications of the optical interference and Moiré methods. Study measurement improved accuracy of optical sensors. Study the application of insedance. 14th Other methods Study a measurement system's case study as a conclusion for the total 14 weeks. Understand a measurement system's case study as a conclusion for the total 14 weeks. 16th Report Total Evaluation Method and Weight (%) Inderstand a measurement system's case study as a conclusion for the total 14 weeks. </td <td></td> <td></td> <td>7th</td> <td>Study the application of elastic defo sensors and the measurement of vi</td> <td></td> <td colspan="3">to sensors and the measurement of vibration</td> | | | 7th | Study the application of elastic defo sensors and the measurement of vi | | to sensors and the measurement of vibration | | |
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| 15th Study a measurement system's case study as a conclusion for the total 14 weeks. Onderstand a measurement system's case study as a conclusion for the total 14 weeks. 16th Report assignment It is a conclusion for the total 14 weeks. Evaluation Method and Weight (%) Total Subtotal 60 40 100 Basic Proficiency 0 0 0 100 | | | 11470 | | ena. | Understand sensors using wave phenomena. | | |
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| Specialized Proficiency 60 40 100 | Subtotal | | | 60 40 | | | 100 | |
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