



## MSDE Module Descriptor

|   |                           |                                       |
|---|---------------------------|---------------------------------------|
| <b>Module Title</b>   | <b>Module Code</b>        | <b>Semester (Sem 1 / Sem 2)</b>       |
| Mechanical Engineering<br>Systems Laboratory  | MSDE 328                  | Sem 2                                 |
| <b>Credits</b>  | <b>Level</b>              | <b>Professor and email</b>            |
| 10  | 6                         | Nak-Kyun CHO<br>nkcho@seoultech.ac.kr |
| <b>Delivery Method</b>  | <b>Delivery Location</b>  |                                       |
| Tutorial, Laboratory  | SeoulTech,<br>Mugung Hall |                                       |
| <b>Module Synopsis</b>  |                           |                                       |
| <p>This module provides mechanical experimental laboratories. Knowledge and characteristics are investigated on mechanical behaviour such as stress/strain and bending, thermal system behaviour such as heat transfer and heat pump, fluid flows, and mechanical vibrations are delivered.</p>   |                           |                                       |
| <b>Outline Syllabus</b>   |                           |                                       |
| <p><b>Overview on the mechanical experiment</b><br/>Introduction of laboratory, Safety education, General experimental procedures, Calibration, Uncertainty analysis by using probability and statistics. Practice on strain gage usage</p> <p><b>Advanced material test laboratory</b><br/>Tensile/Compression, Stress/strain measurement, Poisson ratio test, Principal stress/strain measurements, Bending test</p> <p><b>Mechanical vibration test</b><br/>Cantilever impact test, balancing test, mode shape/natural frequency measurement</p> <p><b>Fluid flow test</b><br/>Bernoulli's equation test, Fluid pressure measurement, Wind tunnel test, Reynold's number measurement</p> <p><b>Thermal property test</b><br/>Heat exchanger test, Temperature measurement,</p> |                           |                                       |
| <b>Indicative Reading:</b>  |                           |                                       |
| <ol style="list-style-type: none"> <li>1) Theory and Design for Mechanical Measurements, R. S. Figliola, 3<sup>rd</sup> ed., John Wiley &amp; Sons, 2000</li> <li>2) Applied Measurement Engineering, C. P. Wright, Prentice Hall, 1994</li> <li>3) Introduction to Mechatronics and Measurement Systems 2<sup>nd</sup> edition, D. Alciatore, McGraw-Hill, 2002</li> </ol>   |                           |                                       |



| NOTIONAL STUDENT WORKLOAD (Hours)  | Hours |
|--|-------|
| MODE OF DELIVERY (FT / PT / DL)  | FT    |
| Lectures   | 20    |
| Seminars   |       |
| Tutorials  |       |
| Laboratories/studios/practical   | 50    |
| Directed learning  | 5     |
| Independent Learning   | 25    |
| Work experience/fieldwork  |       |
| Other: eg formal presentation  |       |
| Total Workload<br>100 hours for a 10 credit module<br>200 hours for a 20 credit module | 100   |

| Module Outcomes |   |
|-----------------|---|
| KU1,2,3         | Evaluate and apply complex knowledge of the scientific and mathematical principles of engineering to solve Real-World problems.<br>Perform advanced analysis of unfamiliar engineering systems.<br>Introduce and utilise complex methodologies to create solutions to a variety of Real-World engineering problems. |
| IPSA 1          | Apply advanced approaches to solving unfamiliar real world engineering problems.  |
| PVA1,2          | Describe, with justification, solutions to benefit society by applying structured engineering practise with a deep awareness of ethical considerations.<br>Critically analyse advanced solutions to complex engineering problems.   |
|                 |   |

| Assessments | Assessment Type                    | Weighting % | Mid-Term/interim/final |
|-------------|------------------------------------|-------------|------------------------|
| Course Work | Laboratory (continuous Assessment) | 70          |                        |
| Course Work | Final Report/Presentation          | 30          | Final                  |



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|--------------|--|--|--|
| Quiz         |  |  |  |
| Test         |  |  |  |
| Laboratory   |  |  |  |
| Exam         |  |  |  |
| Presentation |  |  |  |