**SCME 381 Research Laboratory in Materials Science and Nano Engineering I (1 credit)**

Academic Year 2021

**Class Schedule**: Friday afternoons (1:30-4:20 pm)

**Room:** SC1-255 (lab), SC1-156 (lecture room)

**Coordinator**: Assoc. Prof. Rakchart Traiphol (email: [rakchart.tra@mahidol.ac.th](mailto:rakchart.tra@mahidol.ac.th))

**Instructors:** Assoc. Prof. Rakchart Traiphol (email: [rakchart.tra@mahidol.ac.th](mailto:rakchart.tra@mahidol.ac.th))

Assist. Prof. Toemsak Srikhirin (email: [toemsak.sri@mahidol.ac.th](mailto:toemsak.sri@mahidol.ac.th))

Dr. Tanant Waritanant (email: tanant.war@mahidol.edu)

Assoc. Prof. Taweechai Amornsakchai (email: [taweechai.amo@mahidol.ac.th](mailto:taweechai.amo@mahidol.ac.th))

**Course Description**: This course aims to impart knowledge about the preparation and characterisation of several important classes of materials. Students will undertake a series of practical experiments, and interpret and share results by way of report writing, group discussions, and class presentations.

**Grading Policy:** Student evaluation is in accordance with the rules and regulations of the Faculty of Science, Mahidol University. Letter grades of A, B+, B, C+, C, D+, D, and F will be given according to the student’s score. Course assessment will be based on the following:

**Attendance/Participation 35%**

**Assignments/reports 35%**

**Presentation 30%**

**Reference Materials**

Materials as given by instructors

**Class Schedule**

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|  | **Topic** | **Hours** | **Teaching Methods/multimedia** | **Instructor** |
| **1**  **13/8/21** | Introduction, orientation and safety precautions | **3** | Activities: Lecture class Media: PowerPoint Presentation | Assoc.Prof Rakchart |
| **2**  **20/8/21** | Synthesis of ZnO nanoparticles: Effects of precursors and solvent media | **3** | Activities: Laboratory Media: PowerPoint Presentation | Assoc.Prof Rakchart |
| **3**  **27/8/21** | Characterization of precursors and ZnO by various techniques including FT-IR, UV-vis absorption, SEM and particle size | **3** | Activities: Laboratory Media: PowerPoint Presentation | Assoc.Prof Rakchart |
| **4**  **3/9/21** | Utilization of ZnO nanoparticles as photocatalyst for degradation of dyes (methyl orange and methylene blue) | **3** | Activities: Discussion  Media: PowerPoint Presentation | Assoc.Prof Rakchart |
| **5**  **10/9/21** | Lab discussion/presentation/the utilization of ZnO nanoparticles in different aspects | **3** | Activities: Discussion  Media: PowerPoint Presentation | Assoc.Prof Rakchart |
| **6**  **17/9/21** | Mechanical/tensile testing of thermosetting/thermoplastic/elastomer | **3** | Activities: Discussion  Media: PowerPoint Presentation | Assoc. Prof. Taweechai/ Assist. Prof. Toemsak |
| **7**  **24/9/21** | Mechanical/tensile testing of thermosetting/thermoplastic/elastomer | **3** | Activities: Laboratory Media: PowerPoint Presentation | Assoc. Prof. Taweechai/ Assist. Prof. Toemsak |
| **8**  **1/10/21** | Mechanical/tensile testing of thermosetting/thermoplastic/elastomer | **3** | Activities: Laboratory Media: PowerPoint Presentation | Assoc. Prof. Taweechai/ Assist. Prof. Toemsak |
| **9**  **4-8**  **/10/21** | Mid-term |  |  |  |
| **10**  **15/10/21** | Lab discussion/presentation/ the utilization of these polymers | **3** | Activities: Discussion  Media: PowerPoint Presentation | Assoc. Prof. Taweechai/ Assist. Prof. Toemsak |
| **11**  **22/10/21** | Crystal optics – optical anisotropy, materials birefringence, refractive indices, and Brewster’s angle |  | Activities: Discussion  Media: PowerPoint Presentation | Dr. Tanant |
| **12**  **29/10/21** | Optical fiber – Optical fiber materials and internal structure, single and multimode optical fiber, numerical aperture | **3** | Activities: Laboratory  Media: PowerPoint Presentation | Dr. Tanant |
| **13**  **5/11/21** | MU Vichakarn (no class) | **3** | Activities: Laboratory Media: PowerPoint Presentation |  |
| **14**  **12/11/21** | Lab discussion/presentation/ the utilization of these optical phenomenon | **3** | Activities: Laboratory Media: PowerPoint Presentation | Dr. Tanant |
| **15**  **29/11/21**  **-10/12/21** | Final exam |  |  |  |