

## National Central University, Department of Civil Engineering

### Environment Disaster Monitoring Practice

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**Class Meetings:** Wed. 5/E-248 Fri. 34/E-248

**Office Hours:** Wed. & Fri. 9-10am, or by appointment

**Reference Materials:** Self-prepared materials

<http://140.115.60.47/Teaching/Environmental%20and%20Disaster%20Monitoring%20Practice/EDMP.htm>

#### Grading:

Homework	30
In-Class Exercise	20
Mid-Term Exam(4/20)	25
Final Exam(6/22)	25
TOTAL	100

#### Course Objective

Let student to access the sensor (or transducer) type and its principle for engineering monitoring purpose, also learn the correlated data acquisition and signal processing as fundamental requirement, including the operation of common software and hardware.

#### Course Schedule

1. Introduction (Week 1)
2. Principle of monitoring sensor and transducer (Week 2~4)
  - (1). Sensor and transducer type

- (2). Structural, Geotechnical, Geo-environmental, Hydrological target
3. Data acquisition and signal processing (Week 5~7)
  - (1). A/D conversion principle
  - (2). Discrete signal processing
4. Monitoring system Integrate & setup (Week 9~12)
  - (1). Hardware integration (including Arduino)
  - (2). Visual Basic type programming
  - (3). Labview Basics and Intermediate
5. Applications of Information technology (IT) (Week 13~14)
  - (1). Web development
  - (2). Middleware
  - (3). Networks
  - (4). Wireless Sensor Network (WSN)
  - (5). Internet of Things (IOT)
6. Case study (Week 15~16)  
Including Structural, Geotechnical, Geo-environmental, Hydrological applications.

### **Seminar and Visiting:**

1. 5/2 & 5/16 Wed. 10~12
2. 4/27 Secutech 21 第二十一屆台北國際安全博覽會
3. 工地參觀

Day off : 3/16 & 6/8

### **Coarse materials:**

1. Lectures
2. Optional:
  - 吳瑞賢等人(2008)，天然災害防制導論，全華圖書股份有限公司
  - 廖瑞堂(2001)，山坡地護坡工程設計，科技圖書
  - 林榮渠 (2010)，三聯薪傳.關於大地工程與安全監測，三聯科技教育基金會
  - 鞠志琨（2016），工程監測之基礎理論與實務
  - John Dunncliff (1993) Geotechnical Instrumentation for Monitoring Field Performance, John Wiley & Sons.
  - Geotechnical Instrumentation News
  - Sensor Technologies for Civil Infrastructures: Volume 1: Sensing Hardware and Data Collection Methods for Performance Assessment, Volume 2: Applications in Structural Health Monitoring, Edited by M. L. Wang, J. P. Lynch and H. Sohn, Elsevier.

- Acevedo M.F. (2016) Real-Time Environmental Monitoring: Sensors and Systems, CRC Press.
- Chaulya, S.K. and Prasad, G.M. (2016) Sensing and Monitoring Technologies for Mines and Hazardous Areas, Elsevier.
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