

## Course Outline

**324-541 Electrochemical Analysis (3 credits, 3((3)-0-6))**

**Semester 2 Academic year 2022**

**Coordinator:** Assoc. Prof. Dr. Apon Numnuam (Office room: Ch307/1)

**Lecturer:** Assoc. Prof. Dr. Apon Numnuam, Dr. Itthipon Jeerapan and Prof. Dr. Kwok Feng Chong

**Class:** Monday, Wednesday and Friday at 10.00 –11.00 am at Ch202 or arranged by instructors

### Course description:

Principles and concepts in electrochemical analysis; applications of these techniques in polarography, coulometry, electrogravimetry, voltammetry, electrochemical impedance spectroscopy, recent applications of modern electrochemical techniques to environmental, clinical and food

### Learning objectives:

1. To apply and integrate theory or reaction/interaction based on electrochemical techniques to environmental, clinical and food areas (PLO 1, 4)
2. To demonstrate and analyze data correctly based on electrochemical techniques to related area/work according to research methodology and quality assurance (PLO 2, 3, 8)
3. To be able to communicate and present correctly and precisely (PLO 5)
4. To demonstrate behaviors of morality and research ethics (PLO 7)

### Topic:

Week	Duration	Hour	Topic	Instructor	%
1-6	21 Nov 22 - 30 Dec 22	15	1. Electrochemical Speciation: 1.1 Introduction and Overview 1.2 Application of 1) Polarography 2) Stripping 3) Differential Pulse 4) Coulometry 5) Chronopotentiometry 6) Chronoamperometry	Assoc. Prof. Dr. Apon Numnuam	34
7-12	4 Jan - 6 Feb 23	15	2. Electrochemical Sensor 2.1 Electrode material 2.2 Immobilization technique for	Prof. Dr. Kwok Feng Chong	33

			recognition element 2.3 Transduction mechanism 2.4 Contemporary electrochemical sensor – examples		
12-16	8 Feb - 10 Mar 23	15	3. Recent advance in electrochemical research, wearable/implantable electrochemical biosensor and bioelectronics	Dr. Itthipon Jeerapan	33

**Evaluation:**

Assignments, presentation, examination including active learning

**Recommended books:**

1. A.J. Bard and L.R. Faulkner, Electrochemical methods, 2nd ed., John Wiley & Sons, Inc., New York, 2001.
2. D.T. Sawyer, A. Subkowiak and J.L. Roberts, Jr., Electrochemistry for Chemists, 2nd ed., John Wiley & Sons, Inc., New York, 1995.
3. F. Scholz, Electroanalytical Methods, Springer-Verlag, Berlin, 2002.
4. D.R. Crow, Principles and Applications of Electrochemistry, 3rd ed., Blackie Academic and Profession, Glasgow, 1994.