

<b>COURSE</b>	Name	: Electronic Control System Design
	Code	: EE185540
	Credit(s)	: 2
	Semester	: (Elective Course)

### Description of Course

The electronic control system design course discusses the design of electronic control systems and their digital realization based on microcomputers. At the beginning, the control system design is focused on the state variable method. Pole placement design and state observers are an important part of design. Linear quadratic optimal control is the final discussion of the state variable method. Furthermore, we discuss the nonlinear control system. The discussion ends with a knowledge-based tool for control system which includes neural networks and fuzzy control.

### Learning Outcomes

#### Knowledge

(P02) Mastering engineering concepts and principles to develop the necessary procedures and strategies for systems analysis and design in the areas of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

#### Specific Skill

(KK02) Being able to compose problem solving in engineering through depth and breadth of knowledge which adapts to changes in science and technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

#### General Skill

(KU07) Being able to improve the capacity of learning independently.

#### Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

### Course Learning Outcomes

#### Knowledge

Mastering the concept of designing a digital electronic control system.

#### Specific Skill

Able to design and realize microcomputer-based digital electronic control systems.

#### General Skill

Able to complete the design and realization of electronic control systems for particular applications.

#### Attitude

Demonstrate an attitude of working independently, creatively, and innovatively in problem solving.

### Main Subjects

1. Overview control design
2. Digital control theory and practice
3. State variable methods in automatic control
4. Nonlinear control systems
5. Knowledge-based tools for control system

### Reference(s)

- [1] C. James Taylor, Peter C. Young, Arun Chotai, True digital control: statistical modelling and non-minimal state space design, John Wiley & Sons Ltd, 2013
- [2] Ioan D. Landau and Gianluca Zito, Digital control systems: design, identification and implementation, Springer-Verlag, 2006
- [3] Chi-Tsong Chen, Analog and Digital Control System Design, Saunders College Publishing, 2005
- [4] V. Bobal, J. Böhm, J. Fessl and J. Machacek, Digital self-tuning controllers : Algorithms, Implementation and Applications, Springer-Verlag London Limited, 2005
- [5] M Gopal, Digital Control and State Variable Methods: Conventional and Neural-Fuzzy Control System, McGraw-Hill Education 2004

### Prerequisite(s)

--