講義概要 / Course description

科目基礎情報 / Course information	
開講元学部 / Faculty	理工学部 / FACULTY OF SCIENCE AND TECHNOLOGY
開講元学科 / Department	機能創造理工学科 / DEPARTMENT OF ENGINEERING AND APPLIED SCIENCES
登録コード／Registration Code	SEA6620E
期間 / Period	2019年度 / Academic Year　　春学期 / SPRING
学期 / Semester	春学期 / SPRING
曜限 / Period	木 / Thu　3
科目名 / Course title	TOPICS OF GREEN ENGINEERING 3 / TOPICS OF GREEN ENGINEERING 3
授業形態 / Course Type	講義 / Lecture
科目ナンバリング／Course Numbering	EAS403
レベル／Level	400
教員表示名	LI Ning
主担当教員名 / Instructor	李　寧 / LI NING
単位数 / Credits	2
更新日 / Date of renewal	Feb 27, 2019
講義概要情報 / Course description	
キーワード / Keywords	Electrical and electronics engineering Diode MOSFET integrated circuit amplifier
科目サブタイトル / Subtitle of this course	Microelectronics Circuits II
講義概要 / Course description	This course covers the basic microelectronics circuit design. You will study microelectronics circuit design using diode, and MOS transistor. The fundamental knowledge of electronics such as voltage and current, ohm's law, Thevnin's theory and so on are required. You are required to take Engineering and applied science 3 before this course. This course follows the curriculum policy 4 to acquire the perspectives of "understanding of materials and creation of materials / devices" and "manufacturing and creating systems."
到達目標（授業の目標） / Course objectives	The objective of the course is to introduce the basic microelectronics circuit. The students will learn the models of basic semiconductor devices and get familiar with the basic integrated amplifiers. The objective of this course is to achieve the basic creativity of new systems in the perspectives of "understanding of materials and creation of materials / devices" and "manufacturing and creating systems" required in the diploma policy 4.
授業時間外（予習・復習等）の学習 / Expected work outside of class	All students need to read the corresponding chapters of the textbooks. All students are required to submit their homework in the next week class.
他学部・他研究科受講可否 / Other departments' students	可 / Yes ※要覧記載の履修対象とする年次を確認すること。 Please make sure to confirm the student year listed in the bulletin.
評価基準・割合 / Evaluation	出席状況 / **Attendance**　（20.0％）

	学期末試験（授業期間中）／**Final exam(in class)** （40.0％） 中間試験／**Mid-term exam** （30.0％） 小**テスト**等／**Quizzes.etc.** （10.0％）
テキスト1／Textbooks1	著者名／**Authors** ： Adel S. Sedra, Kenneth C. Smith 書名／**Title** ： *Microelectronics Circuits 5e (The Oxford Series in Electrical and Computer Engineering)* 出版社・出版年／**Publisher.Year** ： Oxford University Press Inc., 2007
テキスト2／Textbook2	著者名／**Authors** ： Behzad Razavi 書名／**Title** ： *Fundamentals of Microelectronics, 2nd edition* 出版社・出版年／**Publisher.Year** ： Wiley, 2013
必要外国語 ／Required foreign languages	English

講義スケジュール／Schedule

授業計画／**Class schedule**	1.Introduction to PN Junction and diode models
	2.Diode circuit analysis I – Rectifier, half-wave rectifier and full-wave rectifier
	3.Diode circuit analysis II – limiter, voltage doubler and level shifter
	4.Introduction to MOSFET, structure of MOSFET, basic operation of MOSFET, behaviour of channel
	5.MOS characteristics I - derivation of I/V characteristics, region of operation
	6.MOS characteristics II - simple MOS model, channel length modulation, etc
	7.Mid-term exam
	8.Biasing, Transconductance
	9.Large signal and small signal operation
	10.Small-signal model, PMOS device
	11.Common-source topology
	12.Biasing technique, introduction to CG stage
	13.Source follower & summary
	14.Final exam