

30/4/2015
2:40pm-4pm

Outline

- Elective course planning
- Summer internship

Elective courses

2012 Curriculum (current EC3 students)

2012 Curriculum (current EC3 students)

Structure and Components

1. General Basic Courses	33	Credits
1.1 Part I	21	Credits
1.1.1 Humanities	3	Credits
1.1.2 Social Sciences	3	Credits
1.1.3 Languages	9	Credits
1.1.4 Science and Mathematics	6	Credits
1.2 Part II	12	Credits
2. Core Courses	111	Credits
2.1 Compulsory Courses	93	Credits
2.2 Compulsory Elective Courses	12	Credits
2.3 Technical Elective Courses	6	Credits
3. Free Elective Courses	6	Credits
Total	<u>150</u>	Credits

2.2 Compulsory Elective Courses	12	Credits
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Select 4 courses (12 credits) from the following courses:

ECS 323	ECS 363	ECS 424	ECS 425
ECS 427	ECS 431	ECS 441	ECS 442
ECS 451	ECS 452	ECS 455	ECS 456
ECS 462	ECS 475	ECS 477	ECS 478
ECS 481	ECS 485	ECS 486	ITS 432

2.3 Technical Elective Courses	6	Credits
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Select 6 credits from the list of courses offered by SIIT, except basic courses.

XXS xxx

3. Free Elective Courses	6	Credits
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Students may choose any free elective courses (not less than 6 credits in total) including general basic courses, except:

1. General basic courses in Science and Mathematics
2. All general basic TU courses in both part 1 and part 2

List of Compulsory Elective Courses
Choose 4 courses from the following list:

Communication Area

ECS	442	Microwave Principles	3(3-0-6)
ECS	451	Data Communications and Networks	3(3-0-6)
ECS	452	Digital Communication Systems	3(3-0-6)
ECS	455	Mobile Communications	3(3-0-6)
ECS	456	Optical Communications	3(3-0-6)
ECS	462	Antennas	3(3-0-6)
ECS	477	Signal Processing for Communication Systems	3(3-0-6)

Electronics Area

ECS	323	Physical Electronics	3(3-0-6)
ECS	424	Analog Integrated Circuits	3(3-0-6)
ECS	425	Digital Integrated Circuits	3(3-0-6)
ECS	427	Introduction to VLSI Design	3(3-0-6)
ECS	431	Industrial Electronics	3(3-0-6)
ECS	441	Communication Electronics	3(3-0-6)

Mechatronics Area

ECS	363	Mechatronic Instrumentation	3(3-0-6)
ECS	475	Digital Image Processing	3(3-0-6)
ECS	478	Introduction to Computer Vision and Pattern Recognition	3(3-0-6)
ECS	481	Introduction to Robotics	3(3-0-6)
ECS	485	Dynamic Systems and Control	3(3-0-6)
ECS	486	Embedded System Development	3(2-2-5)
ITS	432	Real-time and Embedded Systems	3(3-0-6)

2012 Curriculum (current EC3 students)

Semester I Credits (lecture-practice-self study hrs)

ECS	315	Probability and Random Processes	3(3-0-6)
ECS	320	Electronic Circuits Laboratory	1(0-3-0)
ECS	322	Electronic Circuits II	3(3-0-6)
ECS	370	Digital Circuit Laboratory	1(0-3-0)
ECS	381	Feedback Control Systems	3(3-0-6)
ECS	382	Microprocessors EC332 Principle of communications	3(3-0-6)
MES	211	Thermofluids	3(3-1-5)
TU	110	Integrated Humanities EC210 Introductory economics	3(3-0-6)
Sub-Total			20(18-7-35)

<u>Semester II</u> TU110 Integrated humanities			
EC	210	Introductory Economics ECS382 Microprocessors	3(3-0-6)
ECS	332	Principles of Communications	3(3-0-6)
ECS	341	Mobile Application Programming	3(3-0-6)
ECS	380	Feedback Control Laboratory	1(0-3-0)
ECS	386	Introduction to Embedded Systems	3(3-0-6)
ECS	472	Digital Signal Processing ECSxxx Compulsory Elective	3(3-0-6)
ECS	xxx	Compulsory Elective Courses	3(3-0-6)
Sub-Total			19(18-3-36)

Summer

Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track

For Senior Project Track and Foreign Exchange Track

ECS	300	Electronics and Communication Engineering Training	0(0-0-0)
Sub-Total			0(0-0-0)

For Extended Training Track

XXX	xxx	Free Elective	3(x-x-x)
XXX	xxx	Free Elective	3(x-x-x)
Sub-Total			6(x-x-x)

Semester I Credits (lecture-practice-self study hrs)

ECS	396	Project Development EC5386 Intro. embedded system	1(0-3-6)
EC/IT S	xxx	Compulsory Elective Courses	3(x-x-x)
ECS	xxx	Compulsory Elective Courses	3(3-0-6)
ECS	xxx	Compulsory Elective Courses	3(3-0-6)
ECS	450	Signal Processing and Communication Laboratory	1(0-3-0)
IES	303	Engineering Management and Cost Analysis	3(3-0-6)
XXS	xxx	Technical Elective	3(x-x-x)
XXS	xxx	Technical Elective	3(x-x-x)
Sub-Total			20(x-x-x)

Semester II

1) Senior Project Track

ECS	398	Senior Project	6(0-18-0)
XXX	xxx	Free Elective	3(x-x-x)
XXX	xxx	Free Elective	3(x-x-x)

Sub-Total **12(x-x-x)**

2) Foreign Exchange Track

ECS	496	Special Study in EC I	3(3-0-6)
ECS	497	Special Study in EC II	3(3-0-6)
XXX	xxx	Free Elective	3(x-x-x)
XXX	xxx	Free Elective	3(x-x-x)

Sub-Total **12(x-x-x)**

3) Extended Training Track

ECS	399	Extended Electronics and Communication Engineering Training	6(0-40-0)
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Sub-Total **6(0-40-0)**

2013 Curriculum

(current EC2 students)

2013 Curriculum (current EC2 students)

Structure and Components

1. General Basic Courses	30	Credits
1.1 Part I	21	Credits
1.1.1 Humanities	2	Credits
1.1.2 Social Sciences	5	Credits
1.1.3 Languages	9	Credits
1.1.4 Science and Mathematics	5	Credits
1.2 Part II	9	Credits
2. Core Courses	114	Credits
2.1 Compulsory Courses	108	Credits
2.2 Technical Elective Courses	6	Credits
3. Free Elective Courses	6	Credits
Total	<u>150</u>	Credits

Curriculum Comparison

2012 Curriculum

Structure and Components

1. General Basic Courses	33	Credits
1.1 Part I	21	Credits
1.1.1 Humanities	3	Credits
1.1.2 Social Sciences	3	Credits
1.1.3 Languages	9	Credits
1.1.4 Science and Mathematics	6	Credits
1.2 Part II	12	Credits
2. Core Courses	111	Credits
2.1 Compulsory Courses	93	Credits
2.2 Compulsory Elective Courses	12	Credits
2.3 Technical Elective Courses	6	Credits
3. Free Elective Courses	6	Credits
Total	<u>150</u>	Credits

2013 Curriculum

Structure and Components

1. General Basic Courses	30	Credits
1.1 Part I	21	Credits
1.1.1 Humanities	2	Credits
1.1.2 Social Sciences	5	Credits
1.1.3 Languages	9	Credits
1.1.4 Science and Mathematics	5	Credits
1.2 Part II	9	Credits
2. Core Courses	114	Credits
2.1 Compulsory Courses	108	Credits
2.2 Technical Elective Courses	6	Credits
3. Free Elective Courses	6	Credits
Total	<u>150</u>	Credits

2013 Curriculum (current EC2 students)

•No more compulsory electives

2.2 Technical Elective Courses	6	Credits
Select 6 credits from the list of courses offered by Electronics and Communication Engineering Program, except basic courses.		
ECSxxx	ECSxxx	

3. Free Elective Courses **6 Credits**

Students may choose any free elective courses (not less than 6 credits in total) including general basic courses, except:

1. General basic courses in Science and Mathematics
2. All general basic TU courses in both part 1 and part 2

2013 Curriculum (current EC2 students)

Third Year

Semester I

ECS315	Probability and Random Processes	3(3-0-6)
ECS322	Electronic Circuits II	3(3-0-6)
ECS332	Principles of Communications	3(3-0-6)
ECS370	Digital Circuit Laboratory	1(0-3-0)
ECS381	Feedback Control Systems	3(3-0-6)
ECS462	Antennas	3(3-0-6)
MES211	Thermofluids	3(3-1-5)
Sub-Total		19(18-4-35)

Semester II

ECS320	Electronic Circuits Laboratory	1(0-3-0)
ECS380	Feedback Control Laboratory	1(0-3-0)
ECS382	Microprocessors	3(3-0-6)
ECS451	Data Communications and Networks	3(3-0-6)
ECS452	Digital Communication Systems	3(3-0-6)
ECS472	Digital Signal Processing	3(3-0-6)
ECSxxx	Technical Elective	3(x-x-x)
TU110	Integrated Humanities	2(2-0-4)

Sub-Total **19(x-x-x)**

Summer

Select either Senior Project Track, Foreign Exchange Track, or Extended Training Track.

1. Senior Project Track and Foreign Exchange Track

ECS300	Electronics and Communication Engineering Training	0(0-0-0)
Sub-Total		0(0-0-0)

2. Extended Training Track

XXXXxx	Free Elective	3(x-x-x)
XXXXxx	Free Elective	3(x-x-x)
Sub-Total		6(x-x-x)

Fourth Year

Semester I

ECS396	Project Development	1(0-3-0)
ECS450	Signal Processing and Communication Laboratory	1(0-3-0)
ECS456	Optical Communications	3(3-0-6)
ECS442	Microwave Principles	3(3-0-6)
ECSxxx	Technical Elective	3(x-x-x)
IES303	Engineering Management and Cost Analysis	3(3-0-6)
MES371	Material Science for Engineers	3(3-0-6)
TU120	Integrated Social Sciences	2(2-0-4)
Sub-Total		19(x-x-x)

Semester II

1) Senior Project Track

ECS398	Electrical and Communication Engineering Project	6(0-18-0)
XXXXxx	Free Elective	3(x-x-x)
XXXXxx	Free Elective	3(x-x-x)

Sub-Total **12(x-x-x)**

2) Foreign Exchange Track

ECS496	Special Study in EC I	3(3-0-6)
ECS497	Special Study in EC II	3(3-0-6)
XXXXxx	Free Elective	3(x-x-x)
XXXXxx	Free Elective	3(x-x-x)

Sub-Total **12(x-x-x)**

3) Extended Training Track

ECS399	Extended Electronics and Communication Engineering Training	6(0-40-0)
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Sub-Total **6(0-40-0)**

Elective course survey

We need to plan!

- So you do have some “limited” freedom in choosing what you’d like to learn!
- SIIT’s constraint:
 - **A course can be opened if and only if at least 15 students register for it.**
 - A lot of EC electives, but normally only a few courses have enough students to open.
 - Your interested course might not be able to open!
- Also, from past experiences, it is difficult to take intended elective courses opened by other schools such as MT, IE, or ME, due to

ELECTIVE COURSES FOR 2012 CURRICULUM (CURRENT EC3)

2012 Curriculum (EC3): Available Compulsory Elective Courses for survey

- You need 4 compulsory electives in total for graduation

Course Name		Pre-Req	Sem.	Will be open for sure?	Lecturer	Note
ECS 475	Digital Image Processing	ECS 281 Signals and Systems	2		Kondo	expect juniors
ECS 478	Introduction to Computer Vision and Pattern Recognition	None but ECS 475 DIP is recommended.	2		Kondo	expect seniors
ECS 451	Data Communications and Networks	none	2	Yes	Somsak	
ECS 452	Digital Communication Systems	ECS 332 Principles of Communications	2	Yes	Prapun	
ECS 462	Antennas	ECS 233 Electromagnetics	1	Yes	Somsak	
ECS 455	Mobile Communications	ECS 332	2		Prapun	
ECS 456	Optical Communications	ECS 233	1		Atikom (adj)	
ECS 363	Mechatronic Instrumentation	ECS 202, MES 211 Thermofluids, MES 310/311 Thermodynamics	2 (?)			similar to MES381, req. course for ME 3/1, Gen. ME Option
ECS 481	Introduction to Robotics	ECS 381 Feedback Control System	2 (?)			
ECS 424	Analog Integrated Circuits	ECS 322 Electronic Circuits II, ECS 325 Analog Circuits	Any			
ECS 425	Digital Integrated Circuits	ECS 322, ECS 325	any			
ECS 427	Introduction to VLSI Design	ECS 322, ECS 325, ECS 371 Digital Circuits	any			

Suggested Technical/Free Elective Courses for 2012 Curriculum (EC3)

- You need 2 technical electives and 2 free electives

Elective Courses		Pre-Req	Sem.	Lecturer	Comments
ECS 306	Basic Electrical Machines and Power Systems	ECS201, 203 or 216	2	Itthisek	ME 2/2 required course. Must have our own section.
ECS 465	Biomedical instrumentation	ECS261 Electrical measurement and instrumentation	any		Must have our own section
CSS 224	Computer architecture	ECS371 Digital circuits	1		CPE/IT 2/1 required course
CSS 225	Operating system	ITS100	2		CPE/IT 2/2 required course
ITS 322	Database management systems	none	1		CPE/IT 3/1 req course
ITS 336	Artificial intelligence	ITS100	1,2		CPE/IT 3 required course
ITS 341	Management Information systems	ITS100	1		IT 3/1 required course
IES 302	Engineering Statistics	MAS117 or GTS117	2		Must have our own section
MES 300	Engineering Drawing	none	1		with EC 2ndyr students (70 seat limit)
MES 302	Introduction to Computer Aided Design	MES 300	2		ME 2/2 required course**
MES 444	Renewable Energy Resources	none	1		ME 3/1 required course for EM Option
MTS 212	Principles of Management	none	2		MT 2/2 required course.**
MTS 254	Intro to Management Science	none	1		MT 2/1 required course. **
MTS 311	Fundamental Financial Accounting	none	2		MT 2/2 required course**
					** must have our own section (or with IT/CS/CPE)

ELECTIVE COURSES FOR 2013 CURRICULUM (CURRENT EC2)

Suggested Technical/Free Elective Courses for 2013 Curriculum (EC2)

- You need 2 technical electives and 2 free electives in total for graduation
- You have one technical elective for your 2nd semester next year.

	Elective Courses	Pre-Req	Sem.	Lecturer	Comments
ECS 475	Digital Image Processing	ECS 281 Signals and Systems	2	Kondo	expect juniors
ECS 478	Introduction to Computer Vision and Pattern Recognition	None but ECS 475 DIP is recommended.	2	Kondo	expect seniors
ECS 455	Mobile Communications	ECS 332	2	Prapun	
ECS 363	Mechatronic Instrumentation	ECS 202, MES 211 Thermofluids, MES 310/311 Thermodynamics	2		similar to MES381, req. course for ME 3/1, Gen. ME Option
ECS 481	Introduction to Robotics	ECS 381 Feedback Control System	2		
ECS 424	Analog Integrated Circuits	ECS 322 Electronic Circuits II, ECS 325 Analog Circuits	any		
ECS 425	Digital Integrated Circuits	ECS 322, ECS 325	any		
ECS 427	Introduction to VLSI Design	ECS 322, ECS 325, ECS 371 Digital Circuits	any		

Suggested Technical/Free Elective Courses for 2013 Curriculum (EC2): Continued list

Elective Courses		Pre-Req	Sem.	Lectur er	Comments
ECS 306	Basic Electrical Machines and Power Systems	ECS201, 203 or 216	2	Itthisek	ME 2/2 required course. Must have our own section.
ECS 465	Biomedical instrumentation	ECS261 Electrical measurement and instrumentation	any		Must have our own section
CSS 224	Computer architecture	ECS371 Digital circuits	1		CPE/IT 2/1 required course
CSS 225	Operating system	ITS100	2		CPE/IT 2/2 required course
ITS 322	Database management systems	none	1		CPE/IT 3/1 req course
ITS 336	Artificial intelligence	ITS100	1,2		CPE/IT 3 required course
ITS 341	Management Information systems	ITS100	1		IT 3/1 required course
IES 302	Engineering Statistics	MAS117 or GTS117	2		Must have our own section
MES 302	Introduction to Computer Aided Design	MES 300	2		ME 2/2 required course**
MES 444	Renewable Energy Resources	none	1		ME 3/1 required course for EM Option
MTS 212	Principles of Management	none	2		MT 2/2 required course.**
MTS 254	Intro to Management Science	none	1		MT 2/1 required course. **
MTS 311	Fundamental Financial Accounting	none	2		MT 2/2 required course**
					** must have our own section (or with IT/CS/CPE)

Elective course survey

EC elective course survey

Goals of survey:

- 1) To open as many EC elective courses as possible so that most students are satisfied, while meeting the 15-student-per-class constraint.
- 2) To open EC sections for required EC or non-EC courses in other schools such as MT, IE, and ME (e.g., ECS306)

Survey will be done in two (or three) rounds

EC elective course survey: Round 1

Round 1: Get a **shortlist** of compulsory electives for further vote in Round 2.

Rule: For each course, you can vote either “Yes”, “Maybe” or “No”
Equivalent score: “Yes”=1, “Maybe”=0.5, and “No” = 0.

Voting Quota per Student:

- **EC2**: chooses 1 equiv. electives (e.g., [1 Yes] or [2 Maybe's])
- **EC3**: chooses at most 4 equiv. compulsory electives, 2 technical electives and 2 free electives

Decision:

If total score of any course $\geq 8 \rightarrow$ it is in the shortlist.

Beware of the voting quota! If any student chooses more than those stated above, random courses among his/her chosen choices will be dropped until the quota is met.

Remark

- The Decision Rule for Round 1:
If total score of any course $\geq 10 \rightarrow$ it is in the shortlist for the next round. Otherwise, it is dropped from the list.
- Hence, vote “Yes” if you really want the course to open.
- Vote “Maybe” if you are 50%-50% uncertain about taking the course.
- If you are $>70\%$ sure to take the course, recommend vote “Yes”

EC elective course survey: Round 2

Round 2: Re-select from the shortlist from Round 1.

Rule: Only “Yes” or “No”.

Voting Quota per Student (tentative):

You can vote as many courses as you will take.

Decision:

If total score for a course $\geq 15 \rightarrow$ it'll be open!

If at least a course with score $< 15 \rightarrow$ go to Round 3

The students who want to make the “failed” course in Round 2 “pass” in Round 3, should now learn how to persuade/negotiate 😊

EC elective course survey: Round 3 (if needed)

Round 3: Re-select from the selected shortlist from Round 2.

Rule: Only “Yes” or “No”.

Voting Quota per Student:

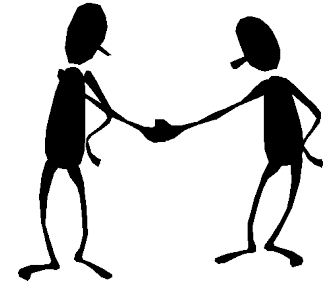
You can vote as many courses as you will take.

Decision:

If total score for a course $\geq 15 \rightarrow$ it'll be open!

A course with score < 15 is dropped.

Our Mutual Agreement



- The School:
 - Will in next year open **all EC courses and non-EC courses that will be opened based on what you selected in the final round**, which could be Round 2 or 3, depending on the rounds' outcomes.
- You:
 - **MUST “register” for all EC courses and non-EC courses that will be opened based on what you selected in the final round. No exception.**
 - “register” means register before the beginning of the semester, otherwise, you won't be allowed to register other courses.
 - You may be allowed to drop the courses but only after the Withdrawal Date, i.e., get 'W' in your transcript.
 - **Hence, starting from Round 2, vote only the courses you will definitely take!!!**
 - You may change your mind between Rounds 2 and 3, subject to the conditions in each round.

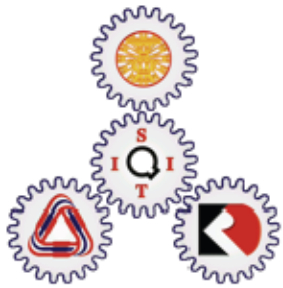
Deadlines for Elective Course Selection

- Round 1: Wed, May 6, noon
- Round 2: Fri, May 8, 4pm
- Round 3 (if needed): Tue, May 12, 4pm
- Voting is done online at <http://goo.gl/forms/gMjiVagdCl> for Round 1
- I will send you the links by email. Check your email that you subscribed in ec2@ict.siit.tu.ac.th and ec3@ict.siit.tu.ac.th
- Everybody must submit his/her vote at each round. If you don't vote, you may lose the chance to take the courses you like.

**Info from EC faculty members on
elective courses**

Info from Faculty Members

- Info about DIP and Computer Vision courses from Aj. Kondo. See details and his senior projects at http://www2.siit.tu.ac.th/somsak/ElectiveSurvey/2015/EC_Talk_2015_Kondo.pdf
- Info about Mobile Comm, Digital Comm, and Optical Comm courses from Aj. Prapun. See details and Aj.Chalie/Aj.Prapun's senior projects at http://www2.siit.tu.ac.th/somsak/ElectiveSurvey/2015/ECTalk2013_Prapun.pdf



ECS 363

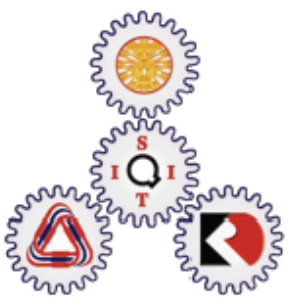
Mechatronic Instrumentation



- The objective of ECS 363 Mechatronic Instrumentation is to establish fundamental understandings of:
 - * Analysis, characteristics, and applications of instruments used in engineering mechatronics:
 - ≡ transducers
 - ≡ sensors
 - ≡ actuators
 - * Measurement principles.
 - * Integrated sensor actuators.
 - * Programmable logic control (PLC).
 - * Data acquisition system
- This course should provide the background knowledge for completing senior projects in robotics and/or mechatronics, as well as the basis for future graduate studies.

•A **transducer** is a device that converts one form of energy to another form of energy.

•An actuator is a transducer that accepts energy and produces the kinetic energy of movement (action).



ECS 363

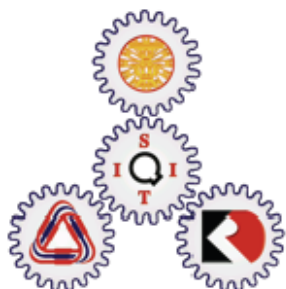


Mechatronic Instrumentation

Week	Description
1	Introduction to Mechatronic Instrumentation
2	Data Acquisition Systems and Signal Processing
3	Sensors I
4	Sensors II
5	Micro-Controllers
6	Mega Project I: Conceptual Pre
7	Review
8	Mid-Term Examination
9	Power Electronics
10	Signal Conditioning
11	Electric, Hydraulic and Pneumatic Actuators
12	Motion Transmission
13	Control Systems
14	Mega Project II: Implementation and Demonstration
15	Review
16	Final Examination

Similar to MES381, req. course for ME 3/1, Gen. ME Option

→ If not enough EC students to open our own EC section, those interested can take MES381 and equivalent to ECS364

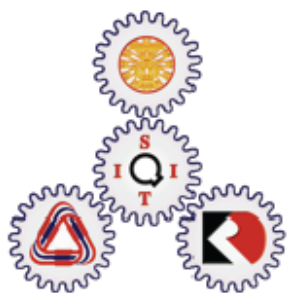


ECS 481

Introduction to Robotics



- The objective of ECS 481 Introduction to Robotics is to establish fundamental understandings of:
 - * Operation principles, analysis, and design of robots.
 - * Mechanical manipulators: kinematics and dynamics.
 - * Navigation and trajectory planning, obstacle avoidance.
 - * Robotic vision and visual feedback.
 - * Robot programming languages.
 - * Control algorithm design (position, velocity, and force).
 - * Current topics of interest from the literature.
- This course should provide the background knowledge for completing senior projects in robotics and/or mechatronics, as well as the basis for future graduate studies.



ECS 48I

Introduction to Robotics

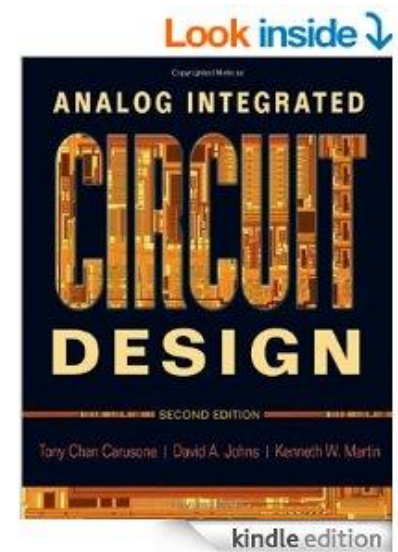
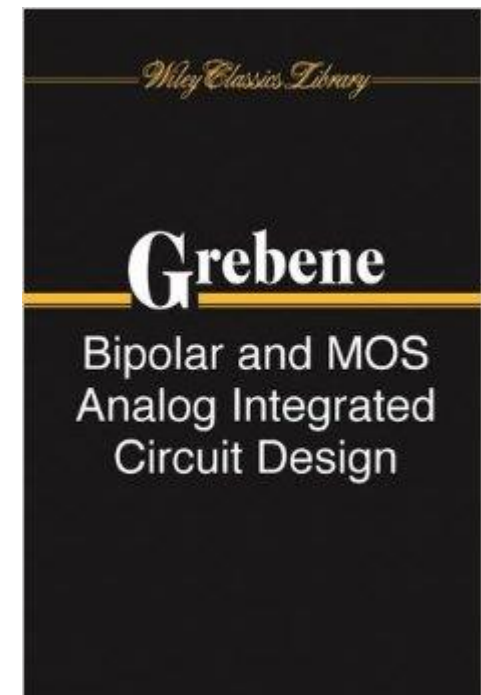
Week	Description
1	Introduction and Background
2	Position and Rotation
3	Rigid Motion and Homogeneous Transformations
4	Denavit-Hartenberg Convention and Forward Kinematics
5	Inverse Kinematics
6	Velocity Kinematics and Jacobian Matrix
7	Review
8	Mid-Term Examination
9	Dynamic Models and Equations of Motion
10	Path Planning (Potential Fields, Gradient Descent, Probabilistic Roadmap)
11	Trajectory Generation (Point to Point Motion, Polynomials, LSPB, Minimum Time)
12	Motion Control (Independent Joint, Feedforward, State Feedback, Optimal Control)
13	Advance Robot Control (Adaptive and Robust Algorithms)
14	Interaction and Force Control
15	Review
16	Final Examination

ECS424 Analog Integrated Circuits 3(3-0-6)

Prerequisite: Have earned credits of ECS322 or consent of Head of School

Output stages and power amplifiers. BJT and MOS circuits of operational amplifiers. Advanced current mirrors and op-amps. Comparators. Voltage references. Data conversion, sample and holds, Nyquist-rate digital-to-analog converter circuits, Nyquist-rate analog-to-digital converter circuits, Oversampling converters. Translinear principles. Analog multipliers and dividers. Phase-locked loops (PLL). Precision rectification.

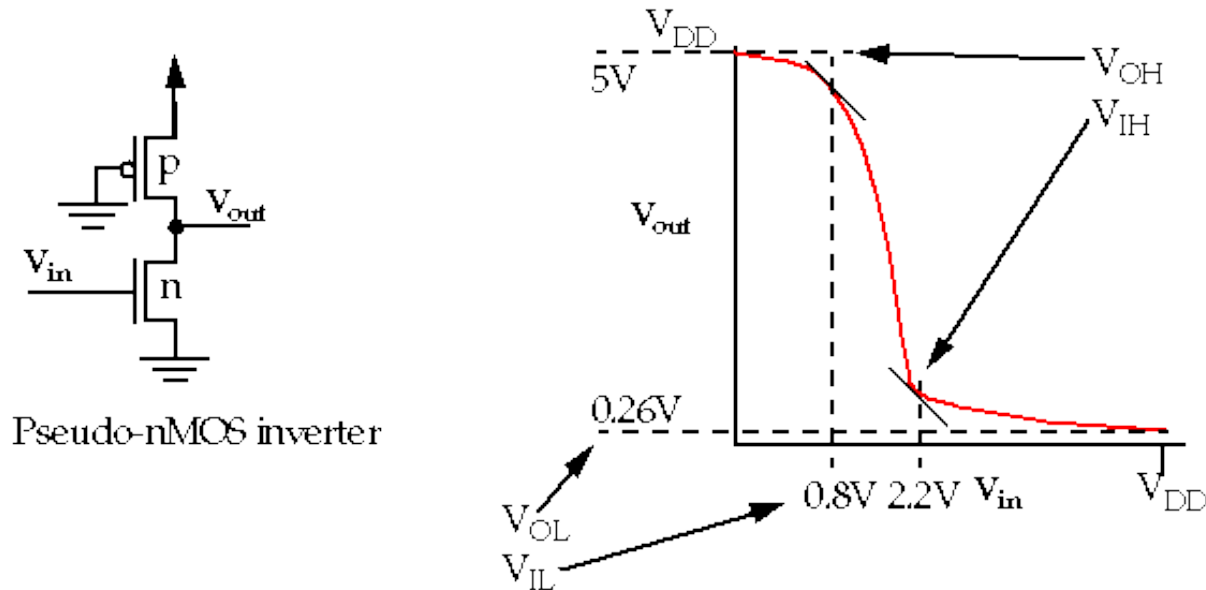
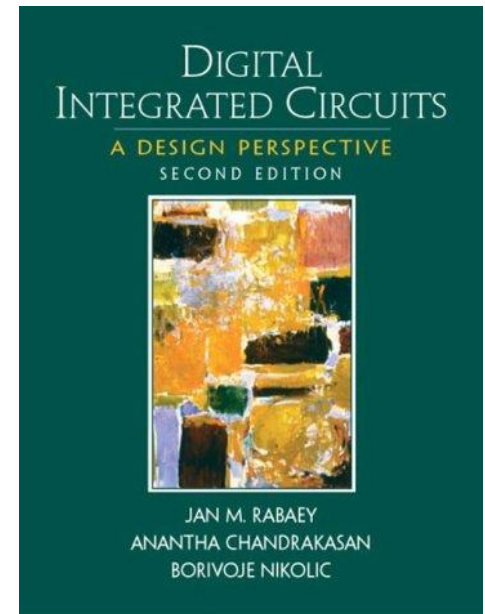
- *Analog* circuits are circuits dealing with signals free to vary from zero to full power supply voltage. This stands in contrast to *digital* circuits, which almost exclusively employ "all or nothing" signals: voltages restricted to values of zero and full supply voltage, with no valid state in between those extreme limits.



ECS425 Digital Integrated Circuits 3(3-0-6)

Prerequisite: Have earned credits of ECS322 or consent of Head of School

Design principles of digital integrated circuits. NMOS inverters, pseudo NMOS, pass transistors, CMOS inverters, transmission gates. Logic families and their characteristics. Sources of propagation delay. Noise margins. Dynamic loads. Crosstalk. Transmission line effects. Advanced design concepts, Programmable gate arrays (PLAs).



$$NM_H = V_{OH} - V_{IH} = 5V - 2.2V = 2.8V$$

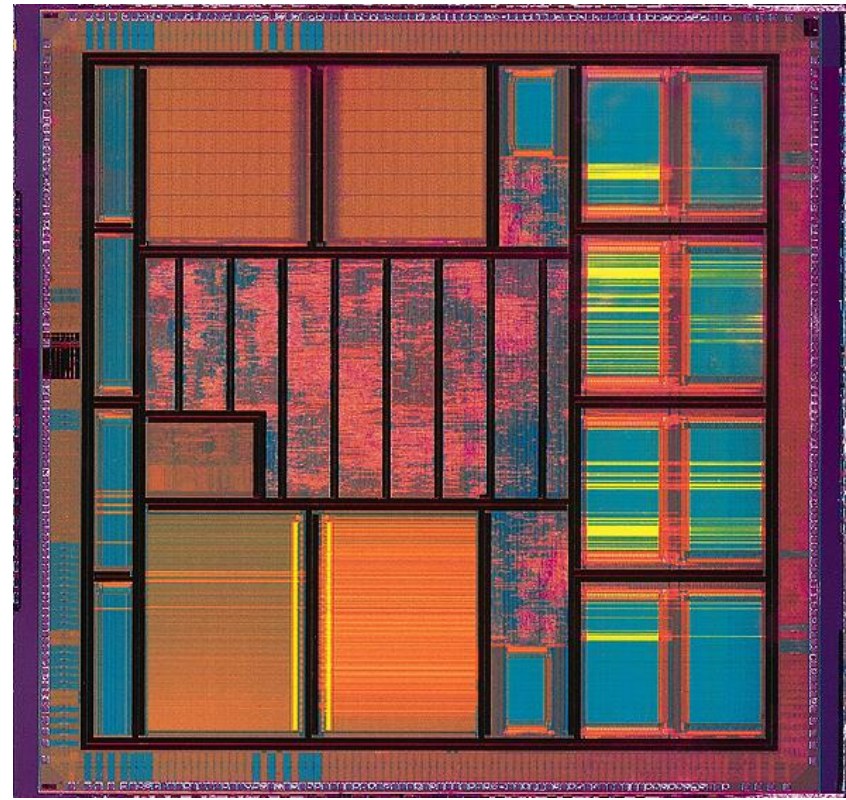
$$NM_L = V_{IL} - V_{OL} = 0.8V - 0.26V = 0.54V \text{ (This is quite a bit worse than } NM_H \text{)}$$

ECS427 Introduction to VLSI Design 3(3-0-6)

Prerequisite: Have earned credits of (ECS371 and ECS322)
or consent of Head of School

Introduction to design and fabrication of very large scale integrated systems using NMOS and CMOS technologies. CAD tools and computer-aided design. Use of state-of-the-art design methodologies and tools. Testing and design for testability. Modularity, parallelism, local communications, fault tolerance.

VLSI integrated
circuit

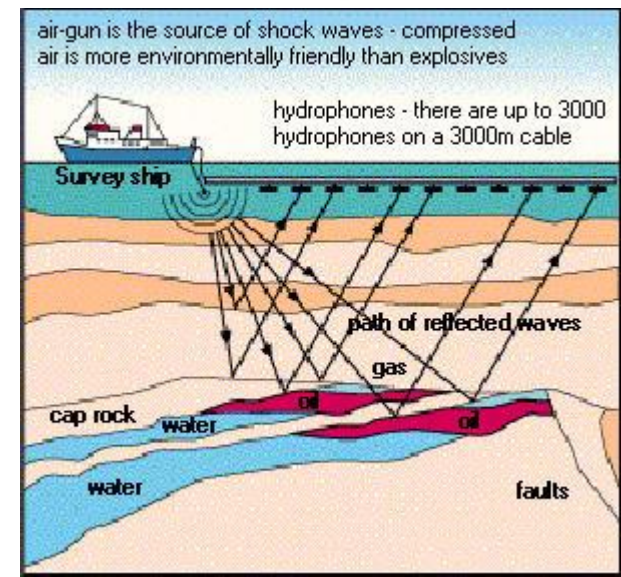
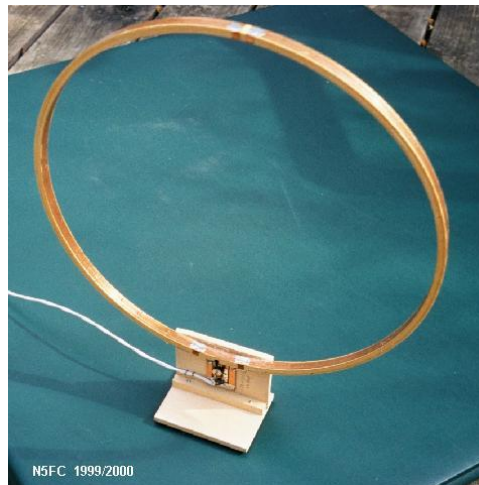


ECS462 Antennas

3(3-0-6)

Prerequisite: Have earned credits of ECS233 or consent of Head of School

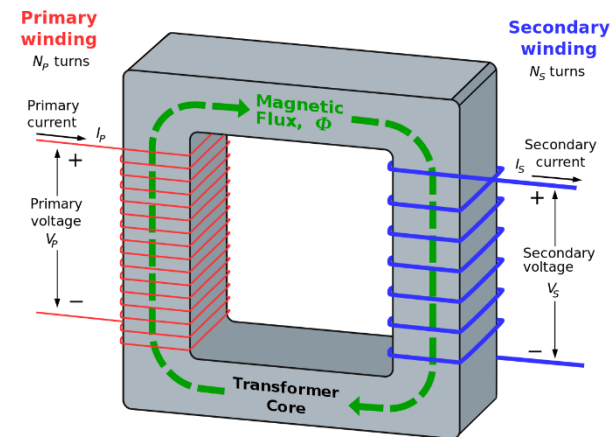
Problem-based learning; Basic definitions and theorems, formulation of the radiation problems, isotropic point source, power and field patterns, directivity and gain, radiation impedance, wave polarization, radiation from current elements. Analysis and design of linear wire antenna, linear array antenna, Uda-Yagi antenna, log-periodic antenna, aperture antenna. Antenna measurement techniques.



ECS306 Basic Electrical Machines and Power Systems

Course description:

- Basic concepts in power system analysis
 - phasors, complex power, power factor improvement,
 - three-phase circuits.
 - Voltage, current and power calculations in single phase and three phase systems.
- Magnetic Circuits and Transformers.
- DC and AC Rotating Machines.
- Induction motor and synchronous generator



- Required course for ME in 2nd yr, Sem.2
- But, many interests from EC students
→ Better to have our own section, taught by Aj. Itthissek (Yeah!)

Course Advertisement:

ITS 488 Geographic information systems (GIS)

- Open for sure in Semester 1/2015
- Aj. Teerayut, IT/CPE

Overview

Geographic Information Systems (GIS) are used in a wide variety of planning, facilities management, resource management, business, and applied research applications. GIS is also providing location-based services and cloud computing. The integration of GPS functionality and increasingly powerful mobile electronics (cell phones, tablets) allows many organizations to use GIS for business intelligence and improve productivity.

See more info

http://www2.siit.tu.ac.th/somsak/ElectiveSurvey/2015/ITS488_Topic%20in%20GIS.pdf

GIS Course description

- Intro do digital mapping/spatial analysis using GIS
- Includes
 - spatial data structures
 - data sources/transfer methods
 - Projections/coordinate systems
 - GPS
 - Geocoding
 - Map design
 - Spatial data processing
 - Spatial analysis
- Raster-vector integration
- Web-based GIS
- Mobile GIS

- Hand-on experiences from
 - Labs
 - Project
- Pre-req: just basic programming
- See more: Open-source GIS software <http://www.qgis.org>

