

**BỘ GIÁO DỤC VÀ ĐÀO TẠO
TRƯỜNG ĐẠI HỌC CÔNG NGHỆ SÀI GÒN**



Advanced Training Programs

***ELECTRICAL ENGINEERING TECHNOLOGY
& TELECOM ENGINEERING TECHNOLOGY***

FACULTY OF ELECTRICAL & ELECTRONICS ENGINEERING

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TP. Hồ Chí Minh, Tháng 7 – 2008

I. CONTENT OF THE TRAINING PROGRAMS:

1/ General Studies Courses: 53 credits:

- Liberal Courses : 20 credits.
- Natural Sciences: 23 credits.
- English : 10 credits.

2/ Core Courses: 44 credits.

3/ Major Courses: ~ 45 credits:

4/ Graduation works: 10 credits,

- Project I : 1 credit.
- Project II : 1 credit.
- Internship : 2 credits.
- Capstone in the major: 6 credits.

5/ List of courses:

a) General Studies: 53 Credits

No.	Code	Course Name	Credits	Hours		Semester
		Marxism	12	180		
1		Philosophy	3(3,0,6)	45	LT	1
2		Economy & Politics	3(3,0,6)	45	LT	2
3		Sozialism	2(2,0,4)	30	LT	3
4		Party History	2(2,0,4)	30	LT	7
5		HoChiMinh Ideology	2(2,0,4)	30	LT	8
		Sozialism & Liberal Courses	8	120		
6		Innovation Methods	2(2,0,4)	30	LT	6
7		Fundamentals of Speech	2(2,0,4)	30	LT	6
8		Engineering Works	2(2,0,4)	30	LT	5
9		Basics of Law	2(2,0,4)	30	LT	7
		Natural Sciences	23	525		
10		Maths I	2(2,1,4)	45	LT+BT	1
11		Maths II	3(3,1,6)	60	LT+BT	2
12		Maths III	3(3,1,6)	60	LT+BT	3
13		Informatics I	2(2,1,4)	45	LT+BT	1
14		Physics I	2(2,1,4)	45	LT+BT	1
15		Physics II	2(2,1,4)	45	LT+BT	2
16		General Chemistry	2(2,1,4)	45	LT+BT	1
17		Applied Mechanics	2(2,1,4)	45	LT+BT	3
18		CAD Tools	2(2,1,4)	45	LT+BT	2
		English	10	150		
22		English I	3(3,0,6)	45	LT	1
23		English II	3(3,0,6)	45	LT	2
24		English III	2(2,0,4)	30	LT	3
25		English IV	2(2,0,4)	30	LT	4
26		Gymnastics				
27		Defense Training				
Total			53			

b) Core Courses: 45 Credits

No.	Code	Course Name	Credits	Hours	MH	Semester
		Advanced Mathematics	4	90		
1		Engineering Mathematics	2(2,1,4)	45	LT+BT	4
2		Probability & Statistics	2(2,1,4)	45	LT+BT	5
		Engineering ... Informatics	3	75		
3		Informatics II : C++/Java	3(2,3,4)	45	LT+BT	2
		Electric Circuits	4	90		
5		Circuits	3(3,1,6)	60	LT+BT	3
6		Circuits Lab	1(0,2,2)	30	TN	4
		Electric	9	120		
7		Electrical Safety	2(2,1,4)	45	LT+BT	3
8		Electromagnetic fields	2(2,1,4)	45	LT+BT	3
9		Electrical Engineering	2(2,1,4)	45	LT+BT	3
10		Electrical Measurement & Electrical Device	2(2,1,4)	45	LT+BT	3
11		Electrical Measurement & Electrical Device Lab	1(0,2,2)	30	TN	4
		Electronics	11	255		
12		Electronics I	3(3,1,6)	60	LT+BT	3
13		Electronics II	3(3,1,6)	60	LT+BT	4
14		Digital Electronics	2(2,1,4)	45	LT+BT	4
15		Electronics I Lab	1(0,2,2)	30	TN	4
16		Electronics II Lab	1(0,2,2)	30	TN	5
17		Digital Electronics Lab	1(0,2,2)	30	TN	5
		Core Courses	13	300		
18		Signals & Systems	3(3,1,6)	60	LT+BT	4
19		Microprocessor	2(2,1,4)	45	LT+BT	4
20		Automatic Control Systems	3(3,1,6)	60	LT+BT	5
21		Automatic Control Systems Lab	1(0,2,2)	30	TN	6
22		Microprocessor Lab	1(0,2,2)	30	TN	5
23			1(0,2,2)	30	TN	6
24			1(0,2,2)	30	TN	6
Tổng cộng :			44			

c) Major Courses:

- Telecom Engineering Technology: 30 credits

No.	Code	Course Name	Credits	Hours	MH	Semester
		Major Courses	24	540		
1		Electronics III	2(2,1,4)	45	LT+BT	5
2		Digital Signal Processing	3(3,1,6)	60	LT+BT	6
3		Communication Systems	3(3,1,6)	60	LT+BT	6
4		Computer Networks	2(2,1,4)	45	LT+BT	6
5		Digital Switching	2(2,1,4)	45	LT+BT	7
6		Micro-circuit Technology	2(3,1,6)	60	LT+BT	7
7		Data Communications	2(2,1,4)	45	LT+BT	7

8		Antenna & Wave propagation	2(2,1,4)	45	LT+BT	7
9		Optical Communication System	3(2,1,4)	45	LT+BT	8
10			1(0,2,2)	30	TN	6
11			1(0,2,2)	30	TN	7
12			1(0,2,2)	30	TN	8
		TET Electives	6	135		
13		- Digital Communication Systems	2(2,1,4)	45	LT+BT	6
14		- Network Security	2(2,1,4)	45	LT+BT	7
15		- Nano Technology	2(2,1,4)	45	LT+BT	8
		- Wireless Communication Technology	2(2,1,4)	45	LT+BT	8
		- Images & Speech processing	2(2,1,4)	45	LT+BT	8
Total :			30			

- Electrical Engineering Technology : 30 Credits

No.	Code	Course Name	Credits	Hours	MH	Semester
		Major Courses	24	570		
1		PLC	2(2,1,4)	45	LT+BT	5
2		Device and Industrial System	2(2,1,4)	45	LT+BT	6
3		Electric Machines	2(2,1,4)	45	LT+BT	7
4		Signals & Systems	2(2,1,4)	45	LT+BT	5
5		Control Systems	3(3,1,6)	60	LT+BT	7
6		Electrical Supply	2(2,1,4)	45	LT+BT	7
7		Electrical net work	2(2,1,4)	45	LT+BT	7
8		Electric Driven	2(2,1,4)	45	LT+BT	6
9		Power system protection	2(2,1,4)	45	LT+BT	8
10		PLC Lab	1(0,2,2)	30	TN	6
11		Signals & Systems Lab	1(0,2,2)	30	TH	8
12		Electrical Supply Lab	1(0,2,2)	30	TN	6
13		Electric Driven Lab	1(0,2,2)	30	TN	7
14			1(0,2,2)	30	TN	7
		EET Electives	6	135		
15		- Embedded PC's	2(2,1,4)	45	LT+BT	6
16		- Industrial Process automatic	2(2,1,4)	45	LT+BT	7
17		- Artificial Intelligence	2(2,1,4)	45	LT+BT	8
		- Scada	2(2,1,4)	45	LT+BT	7
		- Industrial Control Networks	2(2,1,4)	45	LT+BT	8
Total :			30			

- Automatic Control Systems : 29 Credits

No.	Code	Course Name	Credits	Hours	MH	Semester
		Major Courses	23	540		
1		Power Electronics	2(2,1,4)	45	LT+BT	5
2		Digital Signal Processing	2(2,1,4)	45	LT+BT	6
3		Sensor Measurement	2(2,1,4)	45	LT+BT	6
4		Modeling & Simulation	2(2,1,4)	45	LT+BT	6
5		PLC	2(2,1,4)	45	LT+BT	6

6		Modern Control Engineering	3(3,1,6)	60	LT+BT	7
7		Robot Technology	2(2,1,4)	45	LT+BT	8
8		Industrial Process automator	2(2,1,4)	45	LT+BT	7
9		Electric Driver	2(2,1,4)	45	LT+BT	7
10		Power Electrinics Lab	1(0,2,2)	30	TN	6
11		Lab	1(0,2,2)	30	TN	7
12		PLC Lab	1(0,2,2)	30	TN	7
13		Electric Driver Lab	1(0,2,2)	30	TN	8
		EET Electives	6	135		
14		- Embedded Control System	2(2,1,4)	45	LT+BT	6
15		- Computer Vision	2(2,1,4)	45	LT+BT	7
16		- Artificial Intelligent	2(2,1,4)	45	LT+BT	8
		- Intelligent Control System				
		- Industrial Control Network	2(2,1,4)	45	LT+BT	7
		- Scada	2(2,1,4)	45	LT+BT	8
Total :			29			

d) Graduation Works: 10 credits

II/ COURSE DESCRIPTIONS

1. Engineering Mathematics

Course Outline: This course provides the algorithms and numerical methods for students to solve problems in engineering. The course consists of solution of nonlinear equations, solving sets of equations, interpolating polynomials, numerical differentiation and numerical integration, numerical solution of ordinary differential equations, boundary value problems, numerical solution of elliptic, parabolic, hyperbolic partial differential equations, and approximation of functions.

- Textbooks :

Applied Numerical Analysis, Curtis F. Gerald & Patrick O. Wheatley, Addison-Wesley Publishing Company, 1984.

2. Statistics & Probabilities

Course Outline: This course provides the basic knowledge for students about introduction to statistics such as population and samples, problems for the statistic, statistical measures and description of data, and probability, distributions of random variables, discrete probability distribution, normal distribution, sampling theory, estimation of parameters and tests of hypotheses.

- Textbooks:

[1] Introduction to statistics, Ronald E. Walpole, Collier Macmillan Publishers, 1982.

3. C++ Program Language

Course Outline: This course provides the basic knowledge for students in programming C/C++ language such as structure of program, input-output commands, variable declaration, operators, control structure, functions, arrays, pointer variables, structure, enum, close-open files and oriented program.

- Textbooks:

C/C++ the complete reference third edition, Herbert Schildt, McGraw Hill, 1998.

4. Electrical Circuit

Course Outline: This course provides students with the fundamental electrical circuits, analysis circuits, vector graph, converting electrical circuits, electrical power and other complex circuits.

- Textbooks:

[1] Basic Electric Circuit Analysis, D.E. Johnson, J.L. Hilburn, J.R. Johnson, P.D. Scott, Prentice Hall International, 1996.

[2] Schaum's outline of Theory and Problems of Electric Circuits, J.A. Edminister, M. Nahvi, 1997.

5. Electrical Materials, Electronic Devices

Course Outline: This course provides the knowledge for students in the Electronic-Electrical Materials, Passive devices, Diode - Rectifiers, Bipolar Junction Transistor BJT, Control devices and opto electronic devices.

- Textbooks [1] Electronic devices and circuits, Theodore F. Bogart, Jr, Macmillan Publishing Company

6. Electrical safety

Course Outline: This course provides the knowledge for students in the fundamental electrical safety, analysis electrical safety in the electrical circuit networks and protection.

- Textbooks:

[1] Electrical Safety, US Department of Energy Washington, DC 20581, 1998.

[2] Electrical safety HandBook, John Caldic, McGraw Hill, 2006.

7. Electromagnetic Fields

Course Outline:: This course provides the knowledge for students in vector algebra, coordinate systems and vector calculus, analysis electrostatic fields, analysis magnetostatic fields and magnetic Forces, Maxwell's equation and electromagnetic wave propagation.

- Textbooks:

[1] Elements of Electromagnetics, Sadiku, Oxford University Press, 1995.

8. Electronic circuit I

Course Outline: The subject introduces electrical characteristics of basic active components (Diod, BJT, FET, MOSFET, OP.AMP). Applications in signal amplifier (equivalent circuit models, small signal analysis. Principle of feedback amplifier, and determines voltage gain, current gain and input & output impedance of the multistage amplifier types: CASCADE, CASCODE, DARLINGTON, DIFFERENTIAL, AMPLIFIERS...).

- Textbooks:

[1] Electronic circuit Design, Ryder, Mac.Graw Hill, 2002.

[2]. Electronic circuits, Sedra and Smith, Oxford, 2004.

9. Electronic circuit II

Course Outline: The subject introduces frequency response of amplifier using BODE plot and define amplitude, bandwidth of amplifier. Additionally, the subject introduce audio-frequency linear power amplifiers and narrow bandwidth amplifier.

- Textbooks:

[1] Electronic circuit Design, Ryder, Mac.Graw Hill, 2002.

[2]. Electronic circuits, Sedra and Smith, Oxford, 2004.

10. Digital Electronics

Course Outline: The course provide students with a good understanding of numerical systems, code systems, method to present, change, reduce and analyse a Boole function. The subject provides basic knowledge of Logic function and gate for student. The subject presents method to analyse and design combinational and sequential circuits.

- Textbooks:

[1] Digital System, RONALD J. TOCCI, Prentice-Hall International Editions, 2005.

11. Signals & Systems

Course Outline: An introduction to the basic analysis tools of signals and linear systems, including system simulation using MATLAB. The course covers the basic notions of signal representation,

convolution and frequency response changes provoked by linear systems, and Fourier analysis of both signal and systems. The basic concepts are illustrated through home works and projects involving MATLAB processing of digital audio signals.

- Textbooks:

[1] *Fundamentals of Signals and Systems using the web and MATLAB*, E. W. Kamen and B. S. Heck, Prentice-Hall, 2007.

12. MicroProcessor

Course Outline: This course presents the fundamentals of microprocessor architecture and interfacing. Topics include instruction the MCS-51 microprocessor architecture, assembly language and IO device interfacing techniques.

- Textbooks:

[1] *The 8051 Microcontroller and Embedded Systems*, Muhammad Ali Mazidi – Janice Gillispie Mazidi – Rolin D. McKinlay, 2nd Edition, Prentice Hall, 2005

13. Automatic Control Systems

Course Outline: This course provides the fundamental concepts in the theory of automatic control systems and applications. This course concentrates on mathematical modeling of linear systems, state variable, time domain, and frequency domain analysis of control systems. Root locus, Bode diagram, and Nyquist criterion. Analysis and design of discrete control systems.

- Textbooks:

[1] *Automatic Control Systems*, Benjamin C. Kuo, Prentice Hall, 1995.

14. Electronic Circuit III

Course Outline: The course introduces DC regulated circuit, active filters, RF power amplifier, oscillators, modulation circuits AM, FM, FM STEREO, DSB, SSB... and receiver – transmitter systems.

- Textbooks:

[1] *Electronic circuits*, Sedra and Smith, Oxford, 2002.

15. Digital Signal Processing

Course Outline: The course provide students with methods to present digital signal and system, methods to analyse and change the signal. The subject presents methods to process signal in time and frequency domain, methods to analyse and design a signal processing system.

- Textbooks:

[1] *Digital Signal processing*, John G. Proakis & Dimitris G. Manolakis, Macmillan -1990

16. Communication Systems

Course Outline: The fundamental purpose of an communications system is analysis, processing information to transfer information from one space to another. The original source information can be in analog (continuous) form, such as the human voice or music, or in digital (discrete) form, such as binary-coded numbers or alphanumeric codes. All form of information must be converted to electromagnetic energy before being propagated through an electronic communications system. Thus, this course covers the fundamental to advanced knowledge of communication theories and systems, such as transmission,

reception, processing information (modulation and demodulation techniques, coding, mixing, distortion and noise ...) and using electronic circuits to transfer this information.

- Textbooks:

[1] Electronic Communications systems fundamentals through advanced., Wayne Tomasi, Mc Grawhill, 2004.

[2] Principles of communications systems, H. Tanb & D. L. Schilling, Mc Grawhill, 1987.

17. Computer & Network

Course Outline: This course provides students with computer structure (mainboard, cpu, ram, hard disk, power supply, CD, DVD,...), computer network (topology, OSI, TCP/IP, LAN, WAN, Network Devices, ...). Network Operating Systems and Networking services

- Textbooks:

[1]. Ethernet Network, GILBERT HELD, Wiley, 4th Edition, 2003

[2]. Giáo trình hệ thống mạng máy tính CCNA Semester 1-2-3-4, Nguyễn Hồng Sơn, NXB Lao động Xã hội, 2007

18. Optical Communication

Course Outline: Fiber optic systems is the best choice for communication because of its good features against the other systems. The course will give students the basic knowledges about the fiber optic communication systems. The course introduces the terminology used in optical fibers, describes the building blocks of an optical fiber system, facilitates the initial first-order design of optical links, and provides an entry to the research literature of optical fiber system components.

- Textbooks:

[1] An introduction to fiber optic systems, second edition 1997, *John Powers*.

[2] Optical Fiber Communications: Principles and Practice, *J. Senior*, Prentice Hall 1995.

19. Data Communications

Course Outline: The intent of this course is to introduce the student to the field of data communication and networking, two main areas of study: data communications principles and computer networks. This field is very broad, encompassing telecommunication, local area networks and wide area networks. The course objectives provided below highlight the core topics of study for this course. These topics include: the OSI, TCP/IP models; local area network (LAN) standard; LAN topologies, technologies and management; interconnection of LANs; transmission fundamentals; routing algorithms; protocol concepts; data compression, error detection and correction, flow control; network related security and data integrity. After completion of this course the students will have knowledge in data communication and networking concepts and understanding of the various application-oriented communication protocols in open environment.

- Textbooks:

[1] Data Communications and Networking, Behrouz A. Forouzan, McGrawHill, 2004.

20. Micro-Circuit Technology

Course Outline: To introduce the overall knowledge of Integrated circuit Technology, the course includes: Visual inspection: examining some type of wafers such as bipolar, CMOS.

Tracing: tracing to obtain the schematic from the layout in wafer. Drawing characteristic curve of IC components, Package examination

- Textbooks:

[1] Bipolar and MOS Analog Integrated Circuit Design, *Alan B. Grebene*, 2003.

[2] CMOS IC Layout – Concepts, Methodologies and Tools, *Dan Clein*, 2000.

21. Analog Circuit Design

Course Outline: The intent of this course is to introduce the student to the field of analog circuit design. This helps students with the basics of CMOS analog circuit design, a background for CMOS technology and modeling at the circuit level, an understanding of the limits and constraints introduced by technology, hand calculations and design of analog CMOS circuits. The content consists of introduction to Analog Design, CMOS Technology and Device Modeling, feedback Techniques, fundamental Building Blocks for Analog Circuit, operational Amplifiers, design a CMOS Comparator and overview of circuit Simulation

- Textbooks:

[1] Analog Circuit Design (Front End) Course Lecture – Cadence Design Systems, 2004

22. Networks & System Security

Course Outline: This course provides students with the background concepts of cryptography, the cryptographic technologies (DES, AES, RC4, Message Authentication, Hash functions,...) and the network security applications

- Textbooks:

[1] W. Stallings, Cryptography And Network Security - Principles And Practices, 4th Edition, Prentice Hall, 2005.

23. Nano Technology

Course Outline: This course presents the basics of nanotechnology in physics, chemistry and materials. The course further covers nanoelectronics and nanophotonics. The applications of nanotechnology into Telecoms & Networking supply adequate knowledge for the students about this modern technology area of the 21st. century.

- Textbooks:

[1] *Nanotechnology Applications to Telecommunications and Networking*, Daniel Minoli, Wiley Interscience, 2006

24. Power Electronics

Course Outline: Contains the fundamentals of power devices, converters and their applications (solid state DC/AC power supplies, DC/AC motor drives...). The course provides the students the basic knowledge for designing and operating the power electronics equipments in automation and control systems.

- Textbooks:

Power Electronics: Circuits, devices and applications, Rashid M.H., Pearson Education Inc., Pearson Prentice Hall 2004.

25. Electric Driver

Course Outline: This course provides the fundamental concepts about the electric driver systems, strength characteristic of motor, power converters, control DC motor, synchronuons motor, asynchronuons motor, intelligent electric deriver, simulate power electronics and electronic deriver.

- Textbooks:

[1] Giáo trình **Truyền Động Điện** , tác giả: Bùi Quốc Khánh, NXB KHKT 1996

[2] Giáo trình **Truyền Động Điện Thông Minh** , tác giả: Nguyễn Thị Cẩm Bình, NXB KHKT 2006

26. Programable Logic Controller

Course Outline: The course covers or concentrates programming and application of the PLC in automation systems. After finishing the PLC course, the student will most likely be employed in a position of designing, programming, and maintaining systems using PLCs of another brand or model, or even more likely, many machines with many different brands and models of PLC.

- Textbooks:

[1] Automating Manufacturing Systems with PLCs, Hung Jack, 2005.

27. Embedded Control System

Course Outline: This course provides the fundamental concepts of embedded systems and microcontrollers, anlyses and design of embedded systems. This course concentrates on analyses of microprocessing techniques, introduces processors such as the PIC, Atmel AVR... and interface peripherals ... with the concentration on embedded programming systems.

- Textbooks:

[1] Valvano J.W, **Embedded Microcomputer Systems**, Brooks/Cole, 2000

[2] Vahid F., Givargis T. **Embedded System Design**, John Wiley & Sons Inc. 2002

28. Advanced Control

Course Outline: This course provides the advanced concepts of the control theory and applications such as nonlinear control, state feedback control and optimal control..

- Textbooks:

[1] Optimal Control With Engineering Applications, Hans P. Geering, Springer, 2007

29. Robot Technology

Course Outline: This course provides students with the fundamental knowledge of Robotics, manipulator with basic points such as structure, kinematic, dynamic, control and programming languages.

- Textbooks:

[1] Robotics and automatic manufacturing, Richard c. Dorf

[2]] Robotics, K.S.FU

30. Industrial Process Automation

Course Outline: The courses provides background in process technology, models and algorithms of process control.

- Textbooks:

- [1] Tự động hoá quá trình sản xuất, Trần Văn Địch, NXBK&KT, 2001.
- [2] Industrial automation, David W.Pessen, WILEY,1991

31. Artificial Intelligence

Course Outline: The course provides the knowledge of the processing methods based on the modeling biological human intelligence. The course consists of introduction to artificial intelligence, space problems, solving methods, constrain problems, expert systems, knowledge representation, analysis and protection of the power system, planning for robot to control blocks, processing uncertain knowledge, machine learning such as learning based on the knowledge, learning based on neural networks and generic algorithm.

- Textbooks:

- [1] Artificial Intelligence, Stuart Russell & Petter Norvig, Prentice Hall, 1995

32. Industrial Control Network

Course Outline: The course provides the fundamental knowledge for students in the industrial control network such as digital communication network system, interface devices in the industrial control network, the structure and the components of the industrial control network and also the standards communication such as RS232, RS485, IEC1158-2.

- Textbooks:

- [1] Siemens: Simatic Net- Industrial Communication Networks, 2005.

33. Automatic Devices

Course Outline: The course introduces the equipments which are used in industrial automation: sensors, converters and conditioners signal, actuators, controllers. ... delete It also provides the students with the skills: of analysis, design of an automatic system.

- Textbooks:

- [1] Robert N. Bateson **Introduction to control system technology** Prentice-Hall, 1999
- [2] Sabre Solomon **Sensor & control systems in manufacturing**, McGraw-Hill, 1993
- [3] Martin Newman **Industrial electronics & control** Prentice-Hall, 1992

34. Scada

Course Outline: The course provides students the knowledge in the field of the scada system such as background to scada, hardware and firmware, local area networks, modems, facilities computer site central, trouble shooting and maintenance.

- Textbooks:

- [1] Practical Scada for Industrial, David Bailey & Edwin Wright, Jordan Hill, Oxford, 2003.