THAI NGUYEN UNIVERSITY

THAI NGUYEN UNIVERSITY OF TECHNOLOGY

TRAINING PROGRAM
COURSE SYLLABUS

Thai Nguyen - 2020

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Detailed course syllabuses

SEMESTER 1

TT No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
1st semester (16 weeks + 1 week for exams)					
1	GEN101	Integrated skills - Elementary	0	9	FIT
2	GEN102	Learner training 1	0	7	FIT
3	GEN103	Listening skill 1	0	4	FIT
4	GEN104	Reading skill 1	0	4	FIT
(Total)			0	24	

1.1 GEN101 Integrated skills - Elementary

1.1.1 Course name

English: Integrated skills - Elementary

1.1.2 Course code: GEN101

1.1.3 Course duration: 9 credits

Total hours	Lecture hours	Laboratory hours
105	30	0

1.1.4 Prerequisites:

None

1.1.5 Corequisites

None

1.1.6 Course description:

This course is designed to provide learners with a range of vocabulary and grammatical structures related to popular topics at elementary level. Learners also have chances to improve their pronunciation as well as their four language skills including listening, speaking, reading and writing.

1.1.7 Course mission/goal/objectives:

This is a basic course for freshmen of the Advanced Program at Thai Nguyen University of Technology. After finishing this course learners will be able to communicate in English at elementary level quite confidently by applying all the knowledge and skills they have practiced and have been taught during the course.

1.1.8 Learning outcomes:

Students who successfully complete the course are expected to be able to use a certain number of sentence patterns and a suitable amount of vocabulary related to common topics to develop their integrated skills in real life situations at elementary level.

1.1.9 Course topics:

a) Vocabulary

Vocabulary of personal information, family, daily routines, everyday objects, places, free time, food, money, journeys, appearance, films and arts, science, tourism, the earth.

b) Grammar

- Countable and uncountable nouns
- Quantifiers
- Present simple tense, present continuous, present perfect

- Like/love/enjoy + V-ing
- Past simple tense
- Modal verbs
- Simple future, near future
- Pronouns, articles, prepositions
- Comparisons of adjectives and adverbs

Skills

- Listening skills: listening for specific information and gist.
- Reading skills: skimming and scanning, reading for specific information and main ideas, purposes and references.
- Speaking skills:
  - Self-introducing and introducing others
  - Exchanging personal information
  - Likes and dislikes
  - Summarizing an article
  - Surveys
  - Describing people
  - Explaining preferences
  - Giving advice
- Writing skills
  - Punctuations and conjunctions "but", "and", "so", "because"
  - Time words: before, after, then
  - Reference words: her, his, it, they
  - Describing objects and people
  - Formal and informal expressions
  - Writing postcards, textspeak, imperatives, open and closed questions.

1.1.10 Course materials

Textbook

[1] John Hughes, Helen Stephenson, and Paul Dummett. *Life A1-A2 – Elementary*. National Geographic Learning, 2016

Reference books:

[2] M. McCarthy and F. O'Dell. *English vocabulary in use - Elementary*. Cambridge University Press, 2004

[3] S. Cunning and P. Moor. *New cutting edge elementary - Student's Book*. Longman, 2005

[4] E. Walker and S. Elsworth. *Grammar Practice Elementary*. Pearson Education Limited, 2000

[5] R. Murphy. *Essential grammar in use*. Cambridge University Press

1.1.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendance:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a lower percentage of attendance than the requirement (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Besides, homework/groupwork is assessed base on a final presentation, group collaboration and active participation of every member in each goup. Alternatively, homework should be clear, logical and academically presented. Points will be lost for sloppy work. Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

1.2 GEN102 Learner training 1

1.2.1 Course name

English: Learner training 1

1.2.2 Course code: GEN102

1.2.3 Course duration: 7 credits

Lecture hours	Practice hours	Laboratory hours
75	30	0

1.2.4 Prerequisites:

None

1.2.5 Corequisites

None

1.2.6 Course description:

This course is designed to provide English language learners with a range of vocabulary and grammatical structures at the elementary level, which then helps them to use English in real life communication as well as for academic purposes, working targets or entertainment activities.

1.2.7 Course mission/goal/objectives:

This is a compulsory course for freshmen of the Advance Program at Thai Nguyen University of Technology. In particular, Learner Training 1 gives the students fundamental knowledge of the English language; meanwhile, the students will develop their own linguistic capacities in flexible and creative ways under a basic guidance and consultation.

1.2.8 Learning outcomes:

Students who successfully complete the course are capable ofapplying an amount of vocabulary and common grammatical issues in order to:

- Speak, using simple sentence patterns or structures, which are comprehensible enough in communication;
- Write simple, compound and complex sentences as well as paragraphs about the topics they have learnt, make conversations in daily life, and make active and passive sentences, direct and indirect sentences, conditional sentences, comparative sentences and so on.

1.2.9 Course topics:

a) Vocabulary

- Greetings and other useful phrases
- Countries, languages and people
- Family
- Body parts
- Jobs
- Leisure activities
- House, rooms, and furniture

b) Grammar

- Tenses: Present Simple, Present Continuous, Present Perfect, Present Perfect Continuous, Past Simple, Past Continuous, Simple future, Near future
- Countable nouns and uncountable nouns
- Imperatives
- Adverbs, Adjectives
- Auxiliary, short answers, Tag questions
- Positive or negative questions.
- Comparison: Comparative and Superlative Adjectives
- Phrasal Verbs
- Modal verbs
- Active – passive voice
- Conditionals
- Reported speech
- Relative clauses
- Connectors.

1.2.10 Course materials

Textbook

[1] Norman Coe, Mark Harrison, Ken Paterson. *Oxford Practice Grammar*. Oxford University Press

Reference books:

[2] Stuart Redman and Ellen Shaw. *New vocabulary in use*. Cambridge University Press

[3] Michael McCarthy and Felicity O'Dell. *English vocabulary in use*. Cambridge University Press

[4] Raymond Murphy. *Essential grammar in use*. Cambridge University

1.2.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a low percentage of attendance (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Besides, group work is assessed base on a final presentation, group collaboration and active participation of every member in each goup. Alternatively, homework should be clear, logical and academically presented. Points will be lost for sloppy work. Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

1.3 GEN103 Listening skill 1

1.3.1 Course name

English: Listening skill 1

1.3.2 Course code: GEN103

1.3.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
45	15	0

1.3.4 Prerequisites:

None

1.3.5 Corequisites

None

1.3.6 Course description:

Listening Skill 1 is a required course for all 1st year students of Advanced Program. It focuses on comprehension of different types of spoken English including casual conversations, instructions, directions, requests, descriptions, apologies and suggestions.

1.3.7 Course mission/goal/objectives:

The course aims to introduce and develop student's listening skills at the elementary level including listening for key words, details, and gist; listening and making inferences; listening for attitudes; listening to questions and responding; and recognizing and identifying information.

1.3.8 Learning outcomes:

Upon successful completion of this course, students will be able to:

- Understand the speech when it is expressed slowly and clearly; there is a stop to timely receive and process information.
- Understand short conversations with simple structures, slow and clear speech on topics related to everyday life such as occupations, sports, shopping, food, drinks, weather, traveling, etc.
- Understand and follow short and simple instructions that are communicated slowly and carefully

1.3.9 Course topics:

Names and Titles; Time; Dates; Jobs; Sports and Exercise; The Family; Locations; Entertainment; Describing people; Clothes; Prices; Restaurants; Vacations; Apartments;

Movies; Weather; Shopping; Using the telephone; Objects; Directions; People; Countries; Health; The weekend; City transportation; Renting a car; Parties; Restaurants.

1.3.10 Course materials

Textbook

[1] J. C. Richards. *Basic Tactics for Listening*. Oxford University Press, 2003

[2] J. C. Richards. *Developing Tactics for Listening*. Oxford University Press, 2003

Reference books:

[3] L. Lougheed. *Learning to listen, Book 1*. MacMillan, 2003

[4] L. Lougheed. *Learning to listen, Book 2*. MacMillan, 2003

1.3.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a lower percentage of attendance than the requirement (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Homework should be clear, logical and academically presented. Points will be lost for sloppy work. Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

1.4 GEN104 Reading skill 1

1.4.1 Course name

English: Reading skill 1

1.4.2 Course code: GEN104

1.4.3 Course duration: credits

Lecture hours	Practice hours	Laboratory hours
45	15	0

1.4.4 Prerequisites:

None

1.4.5 Corequisites

None

1.4.6 Course description:

This course is designed to provide English language learners with a range of vocabulary at the high elementary level and basic reading skills, which then helps them to use English in real life communication as well as for academic purposes, working targets or entertainment activities.

1.4.7 Course mission/goal/objectives:

This is a compulsory course for freshmen of the Advanced Program at Thai Nguyen University of Technology. In particular, Reading skill 1 gives the students an amount of vocabulary and basic reading skills such as finding the main idea, finding the specific information, guessing the meaning of the words from the context; meanwhile, the students will develop their own linguistic capacities in flexible and creative ways under a basic guidance and consultation.

1.4.8 Learning outcomes:

Students who successfully complete the course are capable of applying an amount of vocabulary and basic reading skills in order to:

- Understand the main idea and the whole content of the reading passages.
- Improve reading skills such as: guessing the meaning of the words using the context, finding specific information, understanding the implication and giving inference.

1.4.9 Course topics:

- Inventions and inventors
- Food

- Mysteries
- Business

1.4.10 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

1.4.11 Course materials

Textbook

[1] Linda Lee and Barbara Bushby. *Thoughts and Notions*. First News, 2nd ed. 2002

Reference books:

[2] Stuart Redman. *Vocabulary in Use*. Pre-Intermediate, Cambridge University Press 1997

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a low percentage of attendance (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Besides, group work is assessed based on presentation, group collaboration and active participation of every member in each goup. Alternatively, homework should be clear, logical and academically presented. Points will be lost for sloppy work. Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

SEMESTER 2

No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
2nd Semester (16 weeks + 1 weeks for exams)					
1	GEN201	Speaking skill	0	3	FIT
2	GEN202	Learner training 2	0	7	FIT
3	GEN203	Listening skill 2	0	7	FIT
4	GEN204	Reading skill 2	0	7	FIT
(Total)			0	24	

2.1 GEN201 Speaking skill

2.1.1 Course name

English: Speaking skill

2.1.2 Course code: GEN201

2.1.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
30	15	0

2.1.4 Prerequisites:

None

2.1.5 Corequisites

None

2.1.6 Course description:

This course is designed to orient the students on the different principles involved in speaking. It is a known fact that Vietnamese students have a hard time speaking in English. It is in the light of this finding and the desire to teach students the craft of speech communication that this course is created to help the students overcome their weakness in speaking and develop the art of speaking.

2.1.7 Course mission/goal/objectives:

The course is designed to introduce the sounds of the English language followed by an overview of the communication process; to help students understand the importance of the need for them to learn to speak and use the English language with the focus on pronunciation, vocabulary, factors affecting learners' speaking ability and common speaking topics with tasks for learners to practice speaking fluently and confidently.

2.1.8 Learning outcomes:

Students are expected to know, learn and practice English as a second language and thereby, overcome their weaknesses in speech communication. To develop confidence in speaking, build vocabulary and use it in daily conversation at home, at school, and outside their comfort zones.

2.1.9 Course topics:

- Roles of speaking in communication
- Factors affecting speaking skills
- Pronunciation and speaking
- How to improve speaking skills

- Common themes in speaking pratice

2.1.10 Course materials

Textbook

[1] Leo Jones. *Let's Talk 2*. Second Edition, Pearson Longman, 2010

Reference book

[2] Mark Hancook. *English Pronunciation in Use*. Cambridge University Press, 2008

[3] Stuart Redman. *Vocabulary in Use - Pre-intermediate*. Cambridge University Press, 2002

2.1.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a low percentage of attendance (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Besides, group work is assessed based on presentation, group collaboration and active participation of every member in each goup. Alternatively, homework should be clear, logical and academically presented. Points will be lost for sloppy work. Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

2.2 GEN202 Learner training 2

2.2.1 Course name

English: Learner training 2

2.2.2 Course code: GEN202

2.2.3 Course duration: 7 credits

Lecture hours	Practice hours	Laboratory hours
75	30	0

2.2.4 Prerequisites:

GEN102 - Learner training 1

2.2.5 Corequisites

None

2.2.6 Course description:

This course is designed to provide English language learners with the knowledge of English grammar from pre-intermediate to upper-intermediate level related to Structure and Written Expression section in the TOEFL ITP test.

2.2.7 Course mission/goal/objectives:

This is a compulsory course for freshmen of the Advanced Program at Thai Nguyen University of Technology. The course aims at helping learners be familiar with effective skills and strategies for doing the Structure and written expression section in the TOEFL ITP test.

2.2.8 Learning outcomes:

Students who successfully complete the course may acquire the knowledge and skills related to English structure and written expression including:

- Sentences with a clause, sentences with multiple clauses, sentences with reduced clauses, sentences with inverted subjects and verbs.
- Problems with subject-verb agreement, parallel structure, comparative and superlative forms, verb forms, use of verbs, passive voice, nouns and pronouns, adjectives and adverbs, articles, prepositions and word-usage.

2.2.9 Course topics:

Chapter 1: Sentences with one clause

Chapter 2: Sentences with multiple clauses

Chapter 3: Sentences with reduced clauses

Chapter 4: Sentences with inverted subjects and verbs

Chapter 5: Problems with subjec/verb agreement

Chapter 6: Problems with parallel structure

Chapter 7: Problems with comparatives and adjectives

Chapter 8: Problems with the form of the verb

Chapter 9: Problems with use of the verb

Chapter 10: Problems with passive voice

Chapter 11: Problems with nouns and pronouns

Chapter 12 Problems with adjectives and adverbs

Chapter 13: More problems with adjectives

Chapter 14: Problems with articles

Chapter 15: Problems with prepositions and word-usage

2.2.10 Course materials

Textbook

[1] D. Phillips. *Longman Introductory course for the TOEFL TEST. The paper test.* New York: Pearson Longman, 2004-2005

[2] D. Phillips. *Longman Preparation course for the TOEFL TEST. The paper test.* New York: Pearson Longman, 2003

Reference books:

[3] Milada Broukal. *TOEFL Grammar Flash*. Peterson's, 2001

2.2.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a low percentage of attendance (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Homework should be clear, logical and academically presented. Points will be lost for sloppy work.Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

2.3 GEN203 Listening Skill 2

2.3.1 Course name

2 English: Listening Skill 2

2.3.2 Course code: GEN203

2.3.3 Course duration: 7 credits

Lecture hours	Practice hours	Laboratory hours
75	30	0

2.3.4 Prerequisites:

GEN103 - Listening skill 1

2.3.5 Corequisites

None

2.3.6 Course description:

In this Listening Skill 2 course, students will practice listening skills from the Pre-Intermediate to Intermediate level and they will be introduced and practice listening skills for the TOEFL-ITP test.

2.3.7 Course mission/goal/objectives:

Listening Skill 2 is under the fundamental knowledge segment for first year students of the Advanced Program.

2.3.8 Learning outcomes:

By the end of the course, students are expected to be able to:

- Comprehend dialogues, conversations or lectures.
- Avoid similar sounds, choosing answers with synonyms
- Listen for negative expressions, restatements, suggestions, passives, expressions of agreements, emphatic expressions of surprise, idioms
- Anticipate topics, questions and listen for answer in order

2.3.9 Course topics:

Restatements, negatives, suggestions, Passives, who and where, agreement, Focus on the second line, Choose answers with synonyms, Avoid similar sounds, Draw conclusions about Who, What, Where; Listen for Who and What in passives, Who and What with multiple nouns, Listen for negative expressions, Listen for double negative expressions, "almost negative" expressions, Negatives with comparatives, Listen for expressions of agreement, uncertainty and suggestion, Emphatic expressions of surprise.

2.3.10 Course materials

Textbook

[1] J.C. Richards. *Developing Tactics for Listening*. Oxford University Press, 2003

[2] D. Phillips. *Longman Introductory course for the TOEFL TEST. The paper test.* New York: Pearson Longman, 2004-2005

[3] D. Phillips. *Longman Preparation course for the TOEFL TEST. The paper test.* New York : Pearson Longman, 2003

Reference books:

[4] L. Lougheed. *Learning to Listen 2*. Macmilan education, 2003

[5] J.C. Richards. *Expanding tactics for listening*. Oxford University Press, 2003

2.3.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a low percentage of attendance (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Besides, group work is assessed base on a final presentation, group collaboration and active participation of every member in each goup. Alternatively, homework should be clear, logical and academically presented. Points will be lost for sloppy work. Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

2.4 GEN204 Reading skill 2

2.4.1 Course name

2 English: Reading skill 2

2.4.2 Course code: GEN204

2.4.3 Course duration: 7 credits

Lecture hours	Practice hours	Laboratory hours
75	30	0

2.4.4 Prerequisites:

GEN104 - Reading skill 1

2.4.5 Corequisites

None

2.4.6 Course description:

This course is designed with a view to giving students an introduction to and practice of reading comprehension skills from low to high intermediate level. Moreover, its aim is also to equip students with reading skills of a TOEFL test.

2.4.7 Course mission/goal/objectives:

This course develops spreading comprehension skills essential for a TOEFL test.

2.4.8 Learning outcomes:

Students who successfully complete the course will be able to understand and use the reading comprehension skills in the TOEFL-ITP test, including:

- Questions about the ideas of the passage: answer main idea questions, recognize the organization of ideas.
- Directly answered questions: answer stated detail questions, find "unstated" details, find pronounce reference.
- Indirectly answered questions: implied detail questions and transitional questions.
- Vocabulary questions: find definitions from structural clues, determine meanings from word parts, use context to determine simple and difficult words.
- Overall review questions: determine where specific information is found, determine the tone, purpose or course.

2.4.9 Course topics:

- Chapter 1: Questions about the ideas of the passage.

- Chapter 2: Directly answered questions.
- hapter 3: Indirectly answered questions.
- hapter 4: Vocabulary questions.
- hapter 5: Overall review questions.

2.4.10 Course materials

Textbook

[1] D. Phillips. *Longman Introductory course for the TOEFL TEST. The paper test.* New York: Pearson Longman, 2004-2005

[2] D. Phillips. *Longman Preparation course for the TOEFL TEST. The paper test.* New York: Pearson Longman, 2003

[3] Milada Broukal. *TOEFL Word Flash*. Peterson's, 2001

Reference books:

[4] Stafford-Yilmaz, Lynn, J.Zwier, Lawrence. *400 Must- Have Words for the TOEFL*. The McGraw-Hill Companies, 2005

[5] Milada Broukal. *TOEFL Reading Flash*. Peterson's, 2001

2.4.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a lower percentage of attendance than the requirement (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Homework/Group work should be clear, logical and academically presented. Points will be lost for sloppy work. Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

SEMESTER 3

TT No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
3rd Semester (16 weeks + 3 weeks for exams)					
1	GMA001	Engineering principles	3	3	FIT
2	ENG104	English for academic purposes	4	4	FIT
3	PHY001	Physics 1	4	4	FIT
4	TCV101	Physical strength education 1	0	1	FIT
5	GEE001	Electrical sciences	3	3	FIT
6	MAT001	Introductory linear algebra	3	3	FIT
7	MAT002	Calculus 1	4	4	FIT
Total			21	23	

3.1 GMA001 Engineering Principles

3.1.1 Course name

English: Engineering Principles

3.1.2 Course code: GMA001

3.1.3 Course duration: 3 credits

Total hours	Lecture hours	Practice hours	Laboratory hours
45	45	0	0

3.1.4 Prerequisites:

None

3.1.5 Corequisites

None

3.1.6 Course description:

This course is the first-level course intended to introduce students to various aspects of Engineering and the fundamental principles used in engineering analysis and design. It also introduces students to the engineering professions and aspects of professionalism including ethics and etiquette. Moreover, it presents engineering problem solving methods and several common engineering models.

3.1.7 Course mission/goal/objectives:

This course plays a role as providing students with the basic concepts of various engineering discipline and careers, the knowledge and skills of solving problems in engineering, the oral and written technical communication skills and engineering ethics which guide engineer's behavior in professional way.

3.1.8 Learning outcomes:

Knowledge:

- Know a wide range of disciplines and careers in engineering.
- Know the standard methods of solving problems in engineering.
- Know accepted standards of academic ethics and can list important academic values.
- Gain an awareness of the connections between engineering and the wider world, recognize the global societal issues.

Skills:

- Obtain and develop analysis and problem solving skills.

- Obtain and develop technical communication skills.
- Obtain and develop teamwork skills.

3.1.9 Course topics:

This course introduces students to the profession, including the disciplines of chemical, civil, computer, electrical, environmental, and mechanical engineering. It also prepares students for success through the integration of the following important skills: technical problem solving and engineering design, ethical decision-making, teamwork, and communicating to diverse audiences.

The topics to be lectured as following:

- Basic concepts about Engineering
- Engineering Careers
- Engineering Disciplines
- Engineering Design
- Feasibility and Project Management
- Technical Communication
- Engineering Ethics
- Engineering Problem Solving
- Engineering Model

3.1.10 Course materials

Textbook

[1] Saeed Moaven. *Engineering Fundamentals: An Introduction to Engineering*. 3rd Ed., 2007

Reference books:

[2] Arvid Eide, Roland Jenison, Larry Northup, Lane Mashaw. *Introduction to engineering design and problem solving*. 2nd Ed., 2001

3.1.11 Grading policy

Seminars (x3):	20%
Midterm exams:	20%
Quizzes (x7):	20%
Final exam:	40%

3.2 ENG104 English for academic purposes

3.2.1 Course name

English: English for academic purposes

3.2.2 Course code: ENG104

3.2.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
40	20	0

3.2.4 Prerequisites

GEN101 - Integrated skills - Elementary (-) GEN201 - Speaking skill
GEN202 - Learner training 2 GEN203 - Listening skill 2
GEN204 - Reading skill 2

3.2.5 Corequisites

None

3.2.6 Course description

This course mainly focuses on developing reading and writing skills for students. The course provides the students with familiar reading texts, articles and a wide range of reading comprehension tasks which form foundation for students to practice academic writing skills. A number of necessary words relating to various topics in each unit are listed and highlighted in order for students to memorize better and use them properly in their writing tasks.

3.2.7 Course mission/goal/objectives

This course trains students with different reading skills such as: scanning, skimming, reading for main ideas, analyzing; so that they can comprehend various types of text. Additionally, academic writing tasks and practices are designed to help students improve their writing skills, which is the main focus of the course.

3.2.8 Learning outcomes

Students who successfully complete the course are able to:

- Understand the meaning of words correctly in context;
- Broaden vocabulary, general knowledge, and grammar points;
- Improve reading skills to explore the content of different texts on various topics;
- Refer to reading as useful samples for writing tasks;

- Write paragraphs and essays of some common kinds: comparison, discussion, problem and solution, cause and effect, process.

3.2.9 Course topics

- Animals
- Customs and traditions
- History
- Transport
- Environment
- Health and fitness
- Discovery and invention
- Fashion
- Economics
- The brain

3.2.10 Course materials

[1] Carolyn Westbrook. *Unlock 3 – Reading and Writing*. Cambridge University Press, 2014

[2] Alice Oshima and Ann Hogue. *Writing Academic English*. Addison – Wesley Publishing Company, 2010

[3] Aracelli M. Villamin and Evelyn Salazar. *Developmental Reading*. Phoenix Publishing House, 2003

[4] Wilhelmina G. Borjal and James W. Pecana. *Skill Builders*. 10th vol., Phoenix Publishing House, 2004

3.2.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a lower percentage of attendance than the requirement (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Homework/Group work should be clear, logical and academically presented. Points will be lost for sloppy work. Missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

3.3 PHY001 Physics 1

3.3.1 Course name

English: Physics 1

3.3.2 Course code: PHY001

3.3.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
60	0	0

3.3.4 Prerequisites:

None

3.3.5 Corequisites

None

3.3.6 Course description:

This is a first course in general physics for engineering, mathematics and computer science majors. Topics covered include the calculus-based study of vectors, particle kinematics, Newton's laws, friction, conservation of energy and momentum, gravitation and rotation. Emphasis is placed on problem solving and applications to laboratory experience.

3.3.7 Course mission/goal/objectives:

The objective of this course is to provide students with a conceptual understanding of Physics. Rather than learning a collection of formulas and how to make use of them in problem solving, the goal is to understand the ideas these mathematical expressions convey. In other words, learn how physics is able to describe physical phenomena by means of very basic principles.

3.3.8 Learning outcomes:

Knowledge:

You will be able to

- Study Newton's laws of motion and learn how to apply them to simple mechanical systems.
- Learn the physical concept of energy and how it relates to different physical systems.
- Study the phenomena involved in gravitation, wave motion and oscillations.
- Study the concepts and phenomena in the fields of heat, thermodynamics and thermal physics.

- Learn how to translate realistic physical problems into the equations which describe them; solve these equations for the
- variables describing the problem; and interpret the results to describe the resulting behavior of the realistic physical system.
- Learn to carry out numerical evaluation of algebraic results rapidly and accurately, using appropriate units for physical quantities.
- Describe simple physical systems by graphing system variables, and interpret graphs of system variables.
- Relate the equations of physics to intuitive concepts.

Abilities:

- Be able to develop an ability to solve basic quantitative problems regarding the properties of kinetics,
- Be able to develop the ability to appropriately apply this knowledge to general scientific problems in various fields of science and engineering.
- Be able to learn and improve experimental skills and methods.

3.3.9 Course topics:

- Motion in one dimension.
- Motion in Two Dimensions.
- The Laws of Motion.
- Applications of Newton's Laws.
- Energy of a System.
- Conservation of Energy.
- Linear Momentum and Collisions.
- Rotation of a Rigid Object About a Fixed Axis.
- Angular Momentum.
- Universal Gravitation.

3.3.10 Course materials

Textbook

[1] Serway and Jewett. *Physics for Scientists and Engineers*. 8th edition, Brooks/Cole

Reference books:

[2] Paul A. Tipler and Gene Mosca. *Physics for Scientists and Engineers*. 6th edition, Newyork. McGraw Hill Company

[3] Fishbane Gasiorowiz and Thornton. *Physics for Scientists and Engineers*. 3rd edition, Pearson hall

[4] David Halliday, Robert Resnick, Jearl Walker. *Fundamentals of physics*. 9th edition, USA. McGraw Hill Companies

3.3.11 Grading policy

Evaluation process (60%)

Content/objectives	Form of Assessment	
	Process test	Homework and Quiz
Motion in One Dimension	20%	20%
Motion in Two Dimensions		
The Laws of Motion		
Applications of Newton's Laws		
Energy of a System		
Conservation of Energy		
Rotation of a Rigid Object About a Fixed Axis	20%	
Angular Momentum		
Universal Gravitation		

Final evaluation(40%)

Form	Exam paper or Test
Content	- Motion in Two Dimensions - Applications of Newton's Laws - Linear and angular Momentum - Rotation of a Rigid Object About a Fixed Axis

The course description is only legal document for teaching and studying performance when it has two authorized signatures and open to all faculty members and student in E-learning page of TNUT before of teaching any classes involved.

3.4 TCV101 Physical strength education 1

3.4.1 Course name

English: Physical strength education 1

3.4.2 Course code: TCV101

3.4.3 Course duration: 1 credit

Total hours	Lecture hours	Practice hours	Laboratory hours
			0

3.4.4 Course description

Nội dung ban hành theo quyết định 3244/GD – ĐT, ngày 12/9/1995 quyết định 1262/GD – ĐT ngày 12/4/1997 trưởng tạo.

3.5 GEE001 Electrical sciences

3.5.1 Course name

English: Electrical sciences

3.5.2 Course code: GEE001

3.5.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

3.5.4 Prerequisites

None

3.5.5 Corequisites

MAT002 - Calculus 1 PHY001 - Physic 1

3.5.6 Course description

Electrical Science is a fundamental course that introduces the basic concepts of electric circuits, and methodologies that are widely used in theoretical and applied electrical engineering. Basic laws such as Ohm's and Kirchhoff's laws, methods of analysis like nodal and mesh method, and circuit theory, e.g., Thevenin's and Norton's theorems will be covered. The step response of first-order and second-order circuit and introductory-level AC circuits will also be included.

3.5.7 Course mission/goal/objectives

The primary objective of this course is to build an understanding of concepts and theory explicitly in electric circuits. Started with basic concepts of charge, current, voltage, power and energy, basic laws and methods for circuit analysis are introduced. These can be used to explain the response of electric circuits under step change of the inputs, i.e., voltage and/or current source.

The course also emphasizes on the relationship between conceptual understanding and problem-solving approaches. During the course, numerous problems are assigned to students as homework for developing the problem-solving skill.

In addition, the course provides students with a strong foundation of engineering practices. The examples and problems are built with realistic component values which represents realizable circuits.

3.5.8 Learning outcomes

- Having completed this course, students will be able to:
- Apply basic laws such as Ohm's and Kirchhoff's laws to analyze an electric circuit.

- Calculate circuit variables using nodal voltage and/or mesh current method.
- Derive equivalent transformation of electric circuits with elements in series, parallel and wye/delta connection or using Thevenin's and/or Norton's theorem.
- Analyze the response of first-order and second-order circuits with step changes of the inputs.
- Derive the phasor representation of AC circuits.
- Calculate the steady-state of AC circuits using nodal and mesh analysis.

3.5.9 Course topics

- Circuit elements: Resistors, inductors and capacitors.
- Basic laws such as Ohm's law, Kirchhoff's current law, Kirchhoff's voltage law.
- Methods of analysis including nodal voltage and mesh current method.
- Circuit transformation and source tranformation using Thevenin's theorem and/or Norton's theorem.
- Operational amplifier including ideal Op Amp, inverting and non-inverting amplifier, summing and difference amplifier, etc.
- Response of first- and second-order circuit to step changes of the input.
- Sinusoidal and phasor repersentation of AC circuits.
- Sinusoidal steady-state analysis using nodal and mesh method, and/or Thevenin's and Norton's tranformation.

3.5.10 Course materials

Textbook

[1] Charles K. Alexander, Matthew N. O. Sadiku. *Fundamental of Electric Circuits*. 5th Edition, Mc Graw Hill, 2013

[2] . .

Reference books:

[3] James W.Nilsson, Susan A. Riedel. *Electric Circuits*. 9th Edition, Prentice Hall, 2011

3.5.11 Grading policy

Homework:	15%
Midterm exams:	30%
Quiz:	15%
Final exam:	40%

3.6 MAT001 Introductory linear algebra

3.6.1 Course name

English: Introductory linear algebra

3.6.2 Course code: MAT001

3.6.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

3.6.4 Prerequisites

None

3.6.5 Corequisites

None

3.6.6 Course description

This course is an introduction to the theory and applications of systems of linear equations and linear operations, focusing on these on finite dimension spaces. Applying widely of this theory, especially in the engineering, is very useful for the developing of the model technology. The linear objects are always simplest and do not take much time to handle. And the results we get are normally very nice. Moreover, many complicated processes can be linearization locally, then solve the problems on each local.

3.6.7 Course mission/goal/objectives

- Offer students the most basic concepts and the most fundamental knowledge about Linear Algebra, one of the most well-developed branches of Mathematics.
- Give students the ability to get the basic skills: in calculating, using appropriate mathematical concepts and operations to interpret data and to solve problems.
- Offer students useful ways to handle their problems in their fields (engineering) in considering to the knowledge of this course.

3.6.8 Learning outcomes

Knowledge:

- Solve linear systems by using the tools of Linear Algebra.
- Get basic knowledge of this theory and the thinking technique from this course.
- Know how to apply the theory and basic concepts, notation of Linear Algebra to solve problems in technology and others of the live.

Abilities:

- Demonstrate the knowledge of fundamental concepts and theory of linear algebra.
- Utilize various problem-solving and critical-thinking technique to set up and solve applied problems in engineering, economics, business and technology fields.
- Communicate accurate mathematical technology and notation in written and oral form to explain strategies to solve the problems as well as to interpret found solutions.
- Use appropriate technology, such as graphic calculators and computer software, effectively as a tool to solve problems.

3.6.9 Course topics

- Matrices, determinant, and linear systems.
- Vector space.
- Linear transformations.
- Eigenvalues, eigenvectors, and applications.

3.6.10 Course materials

Textbook

[1] Larson, Ewards, Falvo. *Elementary Linear Algebra*. 6th edition, Copyright 2009 by Houghton Mifflin Harcourt Publishing Company

Reference books:

[2] Gilbert Strang. *Linear Algebra and Its Applications*. 4th edition,Brook/cole

[3] Howard Anton. *Elementary Linear Algebra*. 4th edition, Wiley and Sons

[4] Ron Lason. *Fundamentals of physics Elementary Linear Algebra*. 7th Edition, Cenpage learning

3.6.11 Grading policy

Evaluation process (50%)

<table>
<tr><th rowspan="2">Content/objectives</th><th colspan="2">Form of Assessment</th></tr>
<tr><th>Homework and Quiz</th><th>Mid-term exams</th></tr>
<tr><td>Linear System</td><td rowspan="6">20%</td><td rowspan="3">10%</td></tr>
<tr><td>Matrix and Determinant</td></tr>
<tr><td>Vector Space</td></tr>
<tr><td>Linear Transformations</td><td rowspan="3">20%</td></tr>
<tr><td>Eigenvalues and Eigenvectors</td></tr>
<tr><td>Applications</td></tr>
</table>

Final evaluation (50%)

Form	Exam paper or test

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3.7 MAT002 Calculus 1

3.7.1 Course name

English: Calculus 1

3.7.2 Course code: MAT002

3.7.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
60	0	0

3.7.4 Prerequisites

None

3.7.5 Corequisites

None

3.7.6 Course description

Calculus 1 is concerned with change and motion,it deals with quantities that approach other quantities. Calculus I is the beginning of a three-semester sequence in calculus for students of mathematics, natural sciences, and engineering.

3.7.7 Course mission/goal/objectives

Calculus 1 is a foundation course at TNUT; it plays an important role in the understanding of science, engineering, economics, and computer science, among other disciplines. The course Calculus I covers differentiation and integration of functions of one variable, with applications.

3.7.8 Learning outcomes

Knowledge:

- Understand the theoretical concept of a limit;
- Understand the theoretical concept of the derivative;
- Understand the theoretical concept of the integral;
- See how the mathematical concepts of integration and differentiation are the natural result of an investigation into the nature of the physical world and perform further investigations using the new tools presented in class.

Abilities:

- Use both the limit definition and rules of differentiation to differentiate functions.
- Sketch the graph of a function using asymptotes, critical points, the derivative test for increasing/decreasing functions, and concavity.

- Apply differentiation to solve applied max/min problems.
- Apply differentiation to solve related rates problems.
- Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
- Communicate mathematically, including understanding, making, and critiquing mathematical arguments.

3.7.9 Course topics

- Limits and Derivatives: The material on limits is motivated by a prior discussion of the tangent and velocity problems. Limits are treated from descriptive, graphical, numerical, and algebraic points of view.
- Differentiation Rules: all the basic functions, including exponential, logarithmic, and inverse trigonometric functions, are differentiated here.
- Applications of Differentiation: The basic facts concerning extreme values and shapes of curves are deduced from the Mean Value Theorem. Graphing with technology emphasizes the interaction between calculus and calculators and the analysis of families of curves.
- Integrals: The area problem and the distance problem serve to motivate the definite integral, with sigma notation introduced as needed.

3.7.10 Course materials

Textbook

[1] James Stewart. *Single Variable Calculus: Early Transcendentals*. Brooks Cole, 7th Ed

Reference books:

[2] Daniel Anderson, Jeffery A. Cole, Daniel Drucker. *Student Solutions Manual for Stewart's Single Variable Calculus*. Brooks/Cole Pub Co; 6th Ed

[3] Richard St. Andre. *Stewart's Single Variable Calculus*. Thomson Learning, 5th Ed

3.7.11 Grading policy

Evaluation process (60%)

Content	Form of Assessment	
	Homework and Quiz	Process Test
Limits and Continuity	10%	20%
Derivatives		
Differentiation Rules		
Applications of Differentiation	10%	20%
Indeterminate Forms and L'Hospital's Rule		
Definite Integral		
Indefinite Integral		

Final evaluation (40%)

Form	Exam paper or Test

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SEMESTER 4

No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
4th Semester (16 weeks + 3 weeks for exams)					
1	MAE001	Statics	3	3	FIT
2	PHY002	Physics 2	3	3	FIT
3	CHE001	General chemistry	4	4	FIT
4	EE0007	Network analysis	3	3	FIT
5	MAT003	Calculus 2	4	4	FIT
6	ENG106	English for engineering	3	3	FIT
7	TCV102	Physical strength education 2	0	1	FFS
8	PHY003	Physics laboratory	1	1	FIT
Total			21	23	
Second year's summer semester					
1	TCV004	National defense education	0	4 weeks	

4.1 MAE001 Statics

4.1.1 Course name

English: Statics

4.1.2 Course code: MAE001

4.1.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

4.1.4 Prerequisites

PHY001 - Physics 1

4.1.5 Corequisites

PHY002 - Physics 2

4.1.6 Course description

This course is designed to give you an introduction to engineering mechanics in static systems. Statics deals with two- and three-dimensional systems of particles and rigid bodies in static equilibrium. Additional topics include concentrated and distributed forces, centers of gravity and centroids, and moments of inertia. Special attention is devoted to forces in frames, structures, beams, and cables. For many of you, this will be your first engineering course. In fields such as mechanical or civil engineering, statics is indispensable in the design and analysis of structures that must hold their shape while bearing a load or performing a task where dynamic forces (forces arising from acceleration of the system) are absent or negligible.

4.1.7 Course mission/goal/objectives

This course develops the fundamentals of engineering mechanics and problem solving skills essential for mechanical engineering.

4.1.8 Learning outcomes

Students who successfully complete the course will be able to apply knowledge of basic mathematics, science, and engineering, such as:

- An ability to construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium.
- An understanding of the analysis of distributed loads.
- A knowledge of internal forces and moments in members.
- An ability to calculate centroids and moments of inertia.
- An ability to solve static equilibrium problems involving friction.

4.1.9 Course topics

- Statics of Particles
- Force system resultants
- Equilibrium of a rigid body
- Structural Analysis
- Internal forces
- Frictions
- Center of Gravity, Centroid and Moments of Inertia

4.1.10 Course materials

Textbook

[1] Ferdinand Beer and E. Russell Johnston. *Vector Mechanics for Engineers: Statics*. 7th edition, Mc-Graw-Hill, New York, 2009

Reference books:

[2] Russell C. Hibbeler. *Engineering Mechanics: Statics*. 12th edition, Prentice Hall, 2008

4.1.11 Grading policy

Attendance:	10%
Quizzes:	20%
Midterm exam:	20%
Final exam:	50%

4.2 PHY002 Physics 2

4.2.1 Course name

English: Physics 2

4.2.2 Course code: PHY002

4.2.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

4.2.4 Prerequisites

PHY001 - Physic 1

4.2.5 Corequisites

None

4.2.6 Course description

To provide students a calculus-based introductory course primarily for chemistry, engineering, and physics majors. Covers the electric field, Gauss' law, electric potential, capacitance, DC circuits, RC circuits, magnetic field, Faraday's law, inductance, LR circuits, AC circuits, and Maxwell's equations.

4.2.7 Course mission/goal/objectives

To learn tools of critical and quantitative analysis and thinking, using Physics as a model. You do not need to memorize the formulas you encounter but you have to master a number of important concepts and know how to apply your knowledge on a broad range of problems in Science and Technology. We will be learning critical and quantitative reasoning. We will learn techniques to check our answers to make sure they are reasonable. We will learn the importance of experimentation on which our theories are built. We will learn problem-solving techniques. In addition, some of the content will have direct applications to your everyday lives as well as your future professional endeavors.

4.2.8 Learning outcomes

Knowledge:

- Utilize the concept of forces to predict the motion of charge and calculate the forces acting on a charge.
- Calculate electric field for various charge distributions
- Find the characteristics of electric fields.
- Discuss the concept of electric potential, relate the electric potential to the electric field

- Calculate currents and potentials in different circuits
- Analyze dc circuits for currents and potentials.
- Find magnetic forces and calculate magnetic fields due to different current distributions.
- Use Faraday's law of induction to predict induced potentials and fields.
- Discuss the nature and origin of electromagnetic waves, calculate the frequencies and wavelength.
- Analyze AC circuits for currents, potentials, and phases.
- Apply multiple physics concepts to a single complex problem without the assistance of study aids.

Abilities:

- Be able to develop an ability to solve basic quantitative problems regarding the properties of kinetics,
- Be able to develop the ability to appropriately apply this knowledge to general scientific problems in various fields of science and engineering.
- Be able to learn and improve experimental skills and methods.

4.2.9 Course topics

- Electric charge.
- Electric field.
- Gauss' law.
- Electric potential.
- Capacitors and dielectrics.
- Currents in materials.
- Direct-current circuits.
- Effects of magnetic fields.
- Production and properties of magnetic fields.
- Faraday's law.
- Inductance and circuit oscillations.

4.2.10 Course materials

Textbook

[1] Fishbane, Gasiorowicz, and Thornton. *Physics for Scientists and Engineers*. 2nd edition. Volume 2, Prentice Hall, 1996

[2] Paul A. Tipler and Gene Mosca. *Physics for Scientists and Engineers*. 6th edition, Newyork. McGraw Hill Company

Reference books:

[3] Serway and Jewett. *Physics for Scientists and Engineers*. 8th edition, Brooks/Cole

[4] David Halliday, Robert Resnick, Jearl Walker. *Fundamentals of physics*. 9th edition, USA. McGraw Hill Companies

4.2.11 Grading policy

Evaluation process (50%)

Topics/Objectives	Form of Assessment	
	Process Test	Homework and Quiz
Electric charge	20%	10%
Electric field		
Gauss' law		
Electric potential		
Capacitors and dielectrics		
Currents in materials		
Direct-current circuits		
Effects of magnetic fields	20%	
Production and properties of magnetic fields		
Faraday's law		
Inductance and circuit oscillations		
Alternating currents		

Final evaluation(50%)

Form	Exam paper or Test
Content	Electric field Electric potential Currents in materials Alternating currents

Special requirement: The course description is only legal document for teaching and studying performance when it has two authorized signatures and open to all faculty members and student in E-learning page of TNUT before of teaching any classes involved.

4.3 CHE001 General chemistry

4.3.1 Course name

English: General chemistry

4.3.2 Course code: CHE001

4.3.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
60	0	0

4.3.4 Prerequisites

None

4.3.5 Corequisites

None

4.3.6 Course description

General Chemistry investigate states of matter, atomic and molecular structure, stoichiometry, thermochemistry, and the periodictable. This course includes gases, solutions, intermolecular forces, kinetics, equilibrium, acidbase theory, and electrochemistry.

4.3.7 Course mission/goal/objectives

General Chemistry course is core science course serving as the first step towards an undergraduate chemistry degree, also laying the foundation for students to pursue more specialized studies in other fields of science and engineering. This course provides a firm basis for understanding the fundamentals of chemistry as well as the fundamental principles and laws of chemistry. Upon completion, students should be able to demonstrate an understanding of chemical concepts as needed to pursue further study in chemistry and related professional fields.

4.3.8 Learning outcomes

Knowledge:

- Understand the basic structures of atoms, ions, and molecules, and ways to quantitatively describe the properties of atoms and molecules in the various phases of pure matter and in mixtures.
- Understand the reactivity of atoms, ions, and molecules, and the various qualitative and quantitative methods for describing or depicting chemical reactions.
- Understand the concept of chemical equilibrium, and the energies that drive chemical reactions: an introduction to the field of thermodynamics.
- Understand the concept of chemical kinetics and the energy required to initiate a chemical reaction.

- Understand the relationship between the electronic configurations of atoms and molecules and their chemical properties: an introduction to the field of quantum mechanics.

Skills:

- Be able to develop an ability to solve basic quantitative problems regarding the properties of molecules, chemical equilibria, and chemical kinetics,
- Be able to develop the ability to appropriately apply this knowledge to general scientific problems in various fields of science and engineering.
- Be able to learn and improve experimental skills and methods.

4.3.9 Course topics

- Matter, Measurement,and Problem Solving
- Atoms and Elements
- Molecules, Compounds,and Chemical Equations
- Chemical Quantities andAqueous Reactions
- Gases
- Thermochemistry
- The Quantum-MechanicalModel of the Atom
- Periodic Propertiesof the Elements
- Liquids, Solids, and IntermolecularForces
- Electrochemistry

4.3.10 Course materials

Textbook

[1] Nivaldo J. Tro. *Principles of Chemistry: A molecular approach*. 2nd Edition, Pearson Education, 2015

Reference books:

[2] John E.Mc Murry, Robert C.Fay. *Chemistry*. Prentice Hall, 5th Edition, 2011

[3] Leo J Malone. *Basic concepts of Chemistry*. Wiley, 9th Edition, 2012

[4] Kenneth W.Whiten, Raymond E.Davis, M.Larry Peck, George G. Staney, David Harris. *General Chemistry*. 8th Edition, 2007

4.3.11 Grading policy

Evaluation process (60%)

Topics/Objectives	Form of Assessment	
	Homework and Quizzes	Midterm exam
Matter, Measurement,and Problem Solving	20%	20%
Atoms and Elements		
Molecules, Compounds,and Chemical Equations		
Chemical Quantities and Aqueous Reactions		
Gases		20%
Thermochemistry		
The Quantum-Mechanical Model of the Atom		
Periodic Propertiesof the Elements		

Final evaluation(40%)

Form	Paper examination
Content	Chemistry: Matter and Measurement Atoms, molecules, and ions Formulas, equations and moles Molecules, compounds, and chemical equations Chemical quantities and aqueous reactions Gases Thermochemistry The quantum-mechanical model of the atom Periodic properties of the elements Liquids, solids, and intermolecular forces Electrochemistry

Attendance policy

- Always bring periodic table and scientific calculator to class
- Students have to attend 80% time of this course

Special requirement: The course description is only legal document for teaching and studying performance when it has two authorized signatures and open to all faculty members and student in E-learning page of TNUT before of teaching any classes involved.

4.4 EE0007 Network analysis

4.4.1 Course name

English: Network analysis

4.4.2 Course code: EE0007

4.4.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

4.4.4 Prerequisites

GEE001 - Electrical sciences

4.4.5 Corequisites

None

4.4.6 Course description

Analysing electrical AC circuits; the phenomenon of electrical AC circuits, waveforms, values, power; frequency response and resonance; magnetic circuits, filters and transmission line; three phase circuits and systems.

4.4.7 Course mission/goal/objectives

- To introduce fundamental theory and mathematics for analysing electrical AC circuits.
- To understand the phenomenon of electrical AC circuits, waveforms, values, power.
- To study the frequency response and resonance.
- To analyse magnetic circuits, filters and transmission line.
- To understand and analyse three phase circuits and systems.
- To introduce a way of thinking for problem solving in electrical engineering.

4.4.8 Learning outcomes

- To introduce fundamental theory and mathematics for analysing electrical AC circuits
- To understand the phenomenon of electrical AC circuits, waveforms, values, power.
- To study the frequency response and resonance.
- To analyse magnetic circuits, filters and transmission line.
- To understand and analyse three phase circuits and systems.
- To introduce a way of thinking for problem solving in electrical engineering.

4.4.9 Course topics

- To introduce fundamental theory and mathematics for analysing electrical AC circuits
- To understand the phenomenon of electrical AC circuits, waveforms, values, power.
- To study the frequency response and resonance.
- To analyse magnetic circuits, filters and transmission line.
- To understand and analyse three phase circuits and systems.
- To introduce a way of thinking for problem solving in electrical engineering.

4.4.10 Course materials

[1] Charles K. Alexander, Matthew N. O. Sadiku. *Fundamentals of Electric Circuits*. Fifth edition

[2] Charles K. Alexander, Matthew N. O. Sadiku. *Solutions Manual to Fundamentals of Electric Circuits*. McGraw-Hill, 2000

[3] S. P. Ghosh, A. K. Chakraborty. *Network analysis and synthesis*. 2010

4.4.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Following current policy of the AP training

4.5 MAT003 Calculus 2

4.5.1 Course name

2 English: Calculus 2

4.5.2 Course code: MAT003

4.5.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
60	0	0

4.5.4 Prerequisites

MAT002 - Calculus 1

4.5.5 Corequisites

None

4.5.6 Course description

Calculus 2 is a second course in the calculus of one variable intended for technology, biology, computer science, economics. Topics include applications of Integration, Parametric Equations and Polar Coordinates, and Infinite Sequences and Series.

4.5.7 Course mission/goal/objectives

The mission of the calculus 2 is to provide students with an understanding of mathematical thought and knowledge, the ability to use this understanding to produce and communicate mathematics, and the preparation to apply these skills to subsequent courses inside and outside of mathematics.

4.5.8 Learning outcomes

Knowledge:

- Interpret the area enclosed between curves as a definite integral and compute its value
- Express the area of a surface of revolution as a Riemann sum of rings, convert it to a definite integral form and compute its value.
- Determine convergence of improper integrals with discontinuities in their domain or with infinite limits of integration and compute their values.
- Compute the length of a curve segment from its parametric representation
- Describe curves and regions of the xy-plane in polar coordinates and use this description to compute lengths and areas.
- Use the concept of the limit at infinity to determine whether a sequence of real numbers is bounded and whether it converges or diverges.

- Interpret the concept of a series as the sum of a sequence, and use the sequence of partial sums to determine convergence of a series
- Distinguish between conditional convergence and absolute convergence of infinite series and be aware of the consequences of reordering terms of a conditionally converging infinite series.
- Use comparison, root, ratio, and integral test to investigate whether a given infinite series is convergent.
- Determine the Taylor series of the nth order and determine an upper bound on its remainder.
- Manipulate Taylor series by substitution and (anti-)differentiation to obtain expansions for other function.

Abilities:

- Apply all knowledge to solve problems about Engineering, Physics, Computer science, and Economics.

4.5.9 Course topics

- Techniques of Integration: All the standard methods are covered but, of course, the real challenge is to be able to recognize which technique is best used in a given situation.
- Applications of Integration: The applications of integration area, volume, work, average value can reasonably be done without specialized techniques of integration. The applications of integration arc length and surface area for which it is useful to have available all the techniques of integration, as well as applications to biology, economics, and physics (hydro static force and centers of mass).
- Parametric Equations and Polar Coordinates: This chapter introduces parametric and polar curves and applies the methods of calculus to them.
- Infinite Sequences and Series: The convergence tests have intuitive justifications as well as formal proofs. Numerical estimates of sums of series are based on which test was used to prove convergence.

4.5.10 Course materials

Textbook

[1] Stewart. *Calculus*. Brooks/Cole Publishing Company; 7th Edition edition ISBN-10: 0538497904; ISBN-13: 978-0538497909

Reference books:

[2] Ron Lason. *Calculus of a Single Variable*. Ninth Edition. ISBN-13: 978-0-547-20998-2; ISBN-10: 0-547-20998-3

[3] The Cauchy-Schwarz Master Class. *An Introduction to the Art of Mathematical Inequalities*. Cambridge University Press, ISBN-10: 052154677X, ISBN-13: 978-0521546775

4.5.11 Grading policy

Evaluation process (60%)

Topics/Objectives	Form of Assessment	
	Homework and Quiz	Process Test
Areas between curves and Volume	10%	20%
Average Value of a Function, Integration by parts		
Trigonometric Integrals, Integration of Rational Functions		
Improper Integrals, Arc Length, Area of a Surface of Revolution		
Curves Defined by Parametric Equations, Calculus with Parametric Curves	10%	20%
Polar Coordinates, Areas and Lengths in Polar Coordinates		
The convergence of Infinite sequences and series		
The convergence of function series as power series		

Final evaluation(40%)

Form	Exam paper

Requirement: The course description is only legal document for teaching and studying performance when it has two authorized signatures and open to all faculty members and student in E-learning page of TNUT before of teaching any classes involved.

4.6 ENG106 English for engineering

4.6.1 Course name

English: English for engineering

4.6.2 Course code: ENG106

4.6.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
36	9	0

4.6.4 Prerequisites

None

4.6.5 Corequisites

None

4.6.6 Course description

This course is based on reading comprehension tasks and language study of different engineering topics so that students are exposed to a number of technical terms and essential grammatical items used in technical English expressions. This course focuses on the skills of reading comprehension of technical readings.

4.6.7 Course mission/goal/objectives

Knowledge:

This course is designed to provide English language learners with a range of basic technical terms and grammatical items on the topics of engineering, materials, forces, electric motor, washing machine, racing bicycle, lasers, portable generator, graphs and applying for a job.

Skills:

This course aims to provide students with practice of reading comprehension of short technical texts; use of certain amount of grammatical items of different engineering topics.

4.6.8 Learning outcomes

Students who successfully complete the course are able to:

- Comprehend certain technical terms of different engineering topics.
- Use grammatical items in technical expressions.

4.6.9 Course topics

Technical terms:

- Engineering
- Materials
- Forces
- Electric motor
- Washing machine
- Racing bicycle
- Lasers
- Portable generator
- Graphs
- Applying for a job

Everyday technical expressions:

- Working in industry
- Tools and equipment
- A tour of the work place
- Trouble shooting
- Maintenance
- Environmental matters
- Safety in the workplace

4.6.10 Course materials

Textbook

[1] Eric H. Glendinning, Norman Glendinning. *Oxford English for Electrical and Mechanical Engineering*. Oxford University Press, 1995

Reference books:

[2] Nick Brieger, Alison Pohl. *Technical English Vocabulary and Grammar*. Summertown Publishing, 2002

[3] Valerie Lambert, Elaine Murray. *English for Work Everyday Technical English*. Longman, 2005

[4] Division of Foreign Languages. *Lecture Notes of English 3*. Thai Nguyen University of Technology, 2012

4.6.11 Grading policy

Group work/Homework:	10%
Progress Test 1:	10%
Progress Test 2:	10%
Attendence:	10%
Final exam:	60%

Attendance would be applied as a zero-tolerance punishment for students who are absent in all classes or perform a low percentage of attendance (i.e, students should be present in class about 80% of the total hours) or show inadequate attitudes towards learning process as well as disruptive behaviors inside classroom buildings.

Besides, missed exams will be assigned a grade of zero unless an acceptable excuse is provided to the instructor, prior to the exam date.

4.7 TCV102 Physical strength education 2

4.7.1 Course name

English: Physical strength education 2

4.7.2 Course code: TCV102

4.7.3 Course duration: 1 credit

4.7.4 Prerequisites

None

4.7.5 Course description

Nội dung ban hành theo quyết định 3244/GD – ĐT, ngày 12/9/1995 quyết định 1262/GD – ĐT ngày 12/4/1997 trưởng tạo.

4.8 PHY003 Physic laboratory

4.8.1 Course name

English: Physic laboratory

4.8.2 Course code: PHY003

4.8.3 Course duration: 1 credits

Lecture hours	Practice hours	Laboratory hours
7.5	0	7.5

4.8.4 Prerequisites

None

4.8.5 Corequisites

PHY002 - Physics 2

4.8.6 Course description

Provide the students abilities of conducting experiments on mechanics, as well as electricity and magnetism.

4.8.7 Course mission/goal/objectives

The mission of the course is to support student learning in the processes of scientific investigation. The process of doing science involves creating and using models to predict and explain measurements of physical quantities. As a group of teaching professionals working in the laboratory, our emphasis is to help students learn to make and interpret measurements, compare data to model predictions, and use the results of their analysis to revise models.

4.8.8 Learning outcomes

- Students who successfully complete Physic lab satisfy the General Education Student Learning Objectives of ensuring that students:
- Possess adequate problem solving, creative reasoning, and critical thinking skills.
- Understand the methods of science and the roles that science and technology have in the modern world.

4.8.9 Course topics

- Uncertainties and error propagation
- Measuring mass and volume
- Determination of earth’s gravity using kater’s pendulum
- Verification of the principle of conservation of linear momentum

- Determining the adiabatic exponent c p/cv of gases
- Double slit interference: measuring the wavelength of light
- The photoelectric effect: determination of planck's constant
- Measurement of the solenoid magnetic field

4.8.10 Course materials

Textbook

None

Reference books:

None

4.8.11 Grading policy

Evaluation process (50%)

Topics/Objectives	Form of Assessment			
	Quiz	Homework	Essay	Prac/Lab
Uncertainties and error propagation				50%
Measuring mass and volume				
Determination of earth's gravity using kater's pendulum				
Verification of the principle of conservation of linear momentum				
Determining the adiabatic exponent cp/cv of gases				
Double slit interference: measuring the wavelength of light				
The photoelectric effect: determination of planck's constant				
Measurement of the solenoid magnetic field				

Final evaluation(50%)

Form	Oral test
Content	Uncertainties and error propagation Measuring mass and volume Determination of earth's gravity using kater's pendulum Verification of the principle of conservation of linear – momentum Determining the adiabatic exponent c p/cv of gases Double slit interference: measuring the wavelength of light The photoelectric effect: determination of planck's constant Measurement of the solenoid magnetic field

SECOND YEAR'S SUMMER SEMESTER

4.9 TCV004 National defence education

4.9.1 Course name

English: National defence education

4.9.2 Course code: TCV004

4.9.3 Course duration: 0 credits (4 weeks)

4.9.4 Prerequisites

None

4.9.5 Course description

The content issued in accordance with Decision No. 81/2007/GĐ – BGDĐT, dated December 24, 2007, by the Minister of Education and Training.

SEMESTER 5

No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
5th Semester (16 weeks + 3 weeks for exams)					
1	MAT004	Calculus 3	4	4	FIT
2	EE0001	Electronic devices and applications 1	3	3	FIT
3	GEE003	Electromagnetic fields	3	3	FIT
4	GEE004	Experimental methods 1	1	1	FIT
5	EE0003	Solid state electronic devices	3	3	FIT
6	TCV103	Physical strength education 3	0	1	FIT
7	MLV101	Philosophy of Marxism and Leninism *For Viet- namese students only.*	3	3	FIT
8	EE0017	Introduction to digital signal processing *Elective for foreign students.*	3	3	FIT
9	GMA007	Principles of communication *For foreign students only*	(3)	(3)	FIT
Total			17 (17)	18 (18)	

5.1 MAT004 Calculus 3

5.1.1 Course name

3 English: Calculus 3

5.1.2 Course code: MAT004

5.1.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
60	0	0

5.1.4 Prerequisites

MAT003 - Calculus 2

5.1.5 Corequisites

None

5.1.6 Course description

This is the third and the final part of our standard three-semester calculus sequence. The distinct feature of this part of the course is its focus on the multi-dimensional analysis, as opposed to one-dimensional analysis that students learned Calculus 1 and Calculus 2.

5.1.7 Course mission/goal/objectives

This semester you will get familiar with such important concepts as a vector, a vector field, a function of several variables, partial derivatives, a line-integral and multi-variable integrals. The ideas of the vector calculus apply to numerous areas of human knowledge such as engineering, physics, pure mathematics, biology, and many others. Some of them we will see in the course, some will surface later in your future special courses, yet some may wait until you become a professional.

5.1.8 Learning outcomes

Knowledge:

- An understanding of limits and continuity of functions of several variables;
- An understanding of linear approximation for multi-variable functions;
- An introduction to optimization of multi-variable functions using the second derivative test and Lagrange multipliers.

Abilities:

- Compute partial derivatives and directional derivatives;
- Evaluate iterated integrals;

- Use multiple integrals to calculate areas, volumes, masses and centers of mass for standard plane regions and solids;
- Communicate mathematically, including understanding, making, and critiquing mathematical arguments.
- Vectors and an introduction to line integrals, path-independence, potential functions and surface integrals;
- An understanding of Green's Theorem, the Divergence Theorem and Stoke's Theorem.

5.1.9 Course topics

- The Geometry of Space: The material on three-dimensional analytic geometry and vectors deals with vectors, the dot and cross products, lines, planes, and surfaces.
- Vector Functions covers vector-valued functions, their derivatives and integrals, the length and curvature of space curves, and velocity and acceleration along space curves, culminating in Kepler's laws.
- Partial Derivatives Functions of two or more variables are studied from verbal, numerical, visual, and algebraic points of view.
- Multiple Integrals: Contour maps and the Midpoint Rule are used to estimate the average snowfall and average temperature in given regions. Double and triple integrals are used to compute probabilities, surface areas, and (in projects) volumes of hyperspheres and volumes of intersections of three cylinders.
- Vector Calculus: Vector fields are introduced through pictures of velocity fields showing San Francisco Bay wind patterns. The similarities among the Fundamental Theorem for line integrals, Green's Theorem, Stokes' Theorem, and the Divergence Theorem are emphasized.

5.1.10 Course materials

Textbook

[1] James Stewart. *Calculus: Early Transcendentals*. Brooks Cole, 7th Ed

Reference books:

[2] Thomas, Weir and Haas. *Early Transcendentals*. Addison Wesley, Inc. 12th Ed

5.1.11 Grading policy

Evaluation process (60%)

Content	Form of Assessment	
	Homework and Quiz	Process Test
Vectors and the Geometry of Space	20%	20%
Derivatives and Integrals of Vector Functions		
Arc Length and Curvature		
Limits and Continuity		
Maximum and Minimum Values		
Double Integrals		20%
Triple Integrals		
Line Integrals		

Final evaluation (40%)

Form	Exam paper or test

Special requirement: The course description is only legal document for teaching and studying performance when it has two authorized signatures and open to all faculty members and student in E-learning page of TNUT before of teaching any classes involved.

5.2 EE0001 Electronic devices and applications 1

5.2.1 Course name

English: Electronic devices and applications 1

5.2.2 Course code: EE0001

5.2.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

5.2.4 Prerequisites

EE0007 - Network analysis

5.2.5 Corequisites

None

5.2.6 Course description

Semiconductor electronic components including MOSFETs, BJTs, DIODEs, and OpAmps. Emphasis on device models and use of solid state electronic devices to analyze, synthesize and design amplifiers and switching circuits. SPICE simulations are extensively utilized. Basic building blocks for analog and digital applications. Theoretical concepts and methods are demonstrated and reinforced through laboratory exercises.

5.2.7 Course mission/goal/objectives

The course aims at giving clear and simplified explanations on the physical construction, relevant characteristics, principles of operation, and applications of several currently and widely used devices in electronic industries and research fields. As far as possible, mathematics is completely avoided. However, simple mathematical analyses are made in situations as and when they are required.

5.2.8 Learning outcomes

- Design and/or analyze opamp, common transistor amplifiers (BJT and FET) and switching circuits.
- Describe and analyze; opamp, transistor and diode circuits using appropriate small or switching models.
- Use PSpice or other modern CAD tools for circuit simulation to assist in the analysis and conformation of circuit design precision.

5.2.9 Course topics

- Large and small signal diode circuits.

- DC and AC analysis of BJT and FET circuits
- Opamp Circuits Analysis
- BJT and FET Differential Amplifiers
- Feedback Circuit
- CMOS Digital Circuits

5.2.10 Course materials

Textbook

[1] Sedra. *Microelectronic circuits w/CD*. Oxford

Reference books:

5.2.11 Grading policy

Process valuation: 60%

Homework:	15%
Midterm exams:	30%
Quiz:	15%

Final evaluation: 40%

Type: Writing

5.3 GEE003 Electromagnetic fields

5.3.1 Course name

English: Electromagnetic fields

5.3.2 Course code: GEE003

5.3.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

5.3.4 Prerequisites

GEE001 - Electrical sciences

5.3.5 Corequisites

MAT004 - Calculus 3

5.3.6 Course description

Electromagnetic Fields is the course focusing on time-harmonic and transient response of transmission lines. Maxwell's equations and their applications to engineering problems in electrostatics, magnetostatics, time-harmonic fields and plane wave propagation.

5.3.7 Course mission/goal/objectives

This course is concerned with the electromagnetic fields and electromagnetic radiation that pervade the world around you. It shows how the main ideas of electromagnetism can be encapsulated in the famous Maxwell's equations. These can be used to explain the properties of light and radiowaves; the magnetic fields produced by brain activity; the way a television tube works; the transparency of the cornea in your eye; and many other phenomena.

5.3.8 Learning outcomes

Having completed this course, students will be able to:

- Use basic vector integral and differential operations to find electromagnetic fields
- Describe how material conductivity, permittivity, and permeability affect an electromagnetic field.
- Calculate the capacitance and/or inductance of simple structures.
- Treat a wire as a transmission line when appropriate.
- Calculate power delivered to a load in a transmission line circuit.
- Design simple transmission line based devices including impedance matching and filters.

- Calculate power transfer in a uniform plane wave.
- Find the electromagnetic field radiated by simple structures.
- Use computational electromagnetics packages to analyze simple structures.

5.3.9 Course topics

- Coulombs law describing force between charges.
- Biot-Savart law giving force between currents.
- Maxwell's equations for static fields.
- Potential and energy stored in static fields.
- Time-dependent Maxwell's equations.
- Transmission of energy in uniform plane waves.
- Derivation of transmission line equations from circuit model.
- Reflection and transmission of power at mismatched loads.
- Radiation of energy as found from the retarded potent.

5.3.10 Course materials

Textbook

[1] K. E. Lonngren et al. *Fundamentals of Electromangetics with Matlab*.

Reference books:

5.3.11 Grading policy

Process evaluation: 60%

Homework:	15%
Midterm exams:	30%
Quiz:	15%

Final evaluation: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

5.4 GEE004 Experimental methods 1

5.4.1 Course name

1 English: Experimental methods 1

5.4.2 Course code: GEE004

5.4.3 Course duration: 1 credits

Lecture hours	Practice hours	Laboratory hours
0	15	0

5.4.4 Prerequisites

PHY002 - Physics 2
GEE001 - Electrical sciences

5.4.5 Corequisites

None

5.4.6 Course description

Basic electrical measurements and instrumentation techniques and devices. Use of voltmeters, ammeters, oscilloscopes, impedance bridges to study resistive, inductive and capacitive circuit elements in steady state and transient operation. Reinforces GEE001 and introduces design of instrumentation networks. Serves as introduction for nonmajors.

5.4.7 Course mission/goal/objectives

To be the first laboratory in electrical measurements and instrumentation techniques and devices, Experimental Methods I is taught for second year students after completing Electrical Sciences course. With this course, the students can practice use of some common laboratory instruments and start to learn how to design, implement and analyze electrical circuits through a series of experiments.

5.4.8 Learning outcomes

- Having completed this course, students will be able to:
- Gain experience using common laboratory instruments including voltmeters, bridges, oscilloscopes, function generators, etc.
- Analyze and observe the effect of measurement on simple circuits.
- Design, implement and analyze simple resistive, capacitive and inductive circuits.
- Learn practical prototyping techniques.

5.4.9 Course topics

Topics covered:

- Voltmeters
- Measurements of resistance
- Kirchhoff's Laws
- Thevenin and Norton equivalents
- Oscilloscope and function generator
- Operational Amplifiers
- RL and RC circuits - time and freq. Response
- Soldering

5.4.10 Course materials

Textbook

[1] . *Laboratory manual*.

Reference books:

[2] Charles K. Alexander, Matthew N. O. Sadiku, Kenneth C. Smith. *Fundamentals of Electrical Circuit*. 5th Edition

5.4.11 Grading policy

Process valuation: 60%

Midterm exams: 60%

Final evaluation: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

5.5 EE0003 Solid state electronic devices

5.5.1 Course name

English: Solid state electronic devices

5.5.2 Course code: EE0003

5.5.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

5.5.4 Prerequisites

None

5.5.5 Corequisites

EE0001 - Electronic devices and applications 1

5.5.6 Course description

Solid state physics basis of modern electronic devices. Introductory quantum mechanics. Energy bands in solids. Electronic properties of semiconductors. Junction diodes. Bipolar transistors. Field effect transistor.

5.5.7 Course mission/goal/objectives

This course covers the fundamental concepts and operational principles of semiconductor devices and their applications. The course content includes semiconductor materials, carriers in semiconductors, energy bands, Fermi-Dirac distribution, p-n junctions, metal-semiconductor junction, field-effect transistors, bipolar junction transistors, high-speed transistors, solar cells, detectors and sensors as well as their applications, especially in space.

5.5.8 Learning outcomes

Having completed this course, students will:

- Be able to solve simple problems involving basic solid state theory.
- Be able to describe diodes and BJTs using both band structure and discrete device models.
- Be able to describe and calculate effects in PN junctions and simple PN junction components.
- Have been introduced to MOSFET devices.

5.5.9 Course topics

- Quantum mechanical background, Energy bands in solids.

- Insulators, semiconductors, and metals.
- Thermal dependence of resistance in metals.
- Electronic properties of undoped semiconductors.
- Thermal dependence of resistance in undoped semiconductors.
- Simple electronic devices: thermocouple, thermistor, photoresister.
- Doping in semiconductors, p and n semiconductors P-N junctions, ideal diode.
- Avalanche and Zener breakdown of a junction
- Diodes, discussion of parameters, switching of a diode. Zener diode, backwards diode, tunnel diode, photodiode, avalanche photodiode, solar cells.
- Light emitting diode and semiconductor lasers
- Metal semiconductor junctions, Schottky diode.
- Capacitance of a junction, varactor.
- Unijunction transistor
- FET transistors, junction FET, MOSFET, n-channel, p-channel, enhancement and depletion MOSFET transistors.
- MESFET transistor
- Bipolar transistors, pnp, npn

5.5.10 Course materials

Textbook

[1] Neamen. *Semiconductor physics and devices*. 3rd edition, McGraw-Hill

Reference books:

5.5.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

5.6 TCV103 Physical strength education 3

5.6.1 Course name

English: Physical strength education 3

5.6.2 Course code: TCV103

5.6.3 Course duration: 1 credit (không lũy)

5.6.4 Prerequisites

None

5.6.5 Course description

The content issued in accordance with Decision No. 3244/GD – ĐT, dated September 12, 1995, and Decision No. 1262/GD – ĐT, dated April 12, 1997, by the Minister of Education and Training.

5.7 MLV101 Philosophy of Marxism and Leninism

5.7.1 Course name

English: Philosophy of Marxism and Leninism

5.7.2 Course code: MLV101

5.7.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

5.7.4 Prerequisites

None

5.7.5 Corequisites

None

5.7.6 Course description

The subject of Philosophy of Marxism and Leninism is the first and compulsory subject in the system of theoretical political subjects in the training program. The content of the course includes 03 chapters, studying the most general laws of motion and development of nature, society, and thought; constructing a worldview, scientific methodology, revolution, applying to scientific cognitive activities and revolutionary practice.

5.7.7 Course mission/goal/objectives

Goals	Goal description	Standard output
G1	Students grasp the basic knowledge of Marxist-Leninist Philosophy.	
G1	Students enhance their understanding and ability to apply the knowledge from the course to research and comprehend the socio-political issues of the country.	
G1	Students develop a political attitude and correct ideological understanding of the scientific socialism subject in particular and the ideological foundation of the Communist Party of Vietnam in general.	

5.7.8 Program Learning outcomes

Goals	Standard output	Goal description	Degree
G1	G1.1	Students have a basic understanding and system of Philosophy and its fundamental issues; Marxist-Leninist Philosophy and the role of Marxist-Leninist Philosophy in social life.	T
	G1.2	Students grasp basic knowledge of materialism and idealism.	T
	G1.3	Students understand the principles of dialectical materialism in theory of cognition.	T
	G1.4	Students understand the basic Marxist-Leninist viewpoint on economic and social formation theory.	T
	G1.5	Students understand the basic viewpoints on classes and nations.	T
	G1.6	Students understand the basic viewpoints on the state and social revolution.	T
	G1.7	Students understand the basic viewpoints on social consciousness.	T
	G1.8	Students understand the basic philosophical viewpoints on human beings.	T
G2	G2.1	They develop logical and dialectical thinking abilities.	T
	G2.2	They begin to creatively apply Marxist-Leninist Philosophy in cognitive and practical activities.	T
	G2.3	They develop a revolutionary worldview, life outlook, and scientific working methods.	T
G3	G3.1	They recognize the scientific significance and value of the subject.	T
	G3.2	They build confidence, ideals, and the inevitable path to the victory of socialism and communism.	T

5.7.9 Course topics

No	Contents	Standard output
1	Content 1: Philosophy and the role of philosophy in social life	G1.1, G2.1-G2.3,

		G3.1-G3.2
2	Content 2: Dialectical materialism	G1.2-G1.3, G2.1-G2.3, G3.1-G3.2, G2.1-G2.3, G3.1-G3.2
3	Content 3: Historical materialism	G1.4-G1.8

5.7.10 Course materials

Textbook

[1] Bộ Giáo dục và Đào tạo. *Giáo trình môn Triết học Mác – Lênin*. NXB Chính trị quốc gia, Hà Nội, 2019

Reference books:

[2] Bộ Giáo dục và Đào tạo. *Giáo trình Triết học Mác – Lênin*. NXB Chính trị quốc gia, Hà Nội, 2006

[3] Khoa Triết học – Học viện Chính trị Quốc gia Hồ Chí Minh. *Giáo trình Chủ nghĩa duy vật biện chứng*. NXB Chính trị quốc gia, Hà Nội, 2004

[4] Khoa Triết học - Học viện Chính trị Quốc gia Hồ Chí Minh. *Giáo trình Chủ nghĩa duy vật lịch sử*. NXB Chính trị quốc gia, Hà Nội, 2004

[5] . *Một số vấn đề về chủ nghĩa Mác - Lênin trong thời đại hiện nay*. NXB Chính trị quốc gia, Hà Nội, 2000

5.7.11 Grading policy

Form	Contents	Time	Tool	Standard output	Rate %
written	Evaluation and assessment of students' understanding of the course content from Week 1 to Week 5.	Week 5	Midterm exam 1	G1.1, G1.2, G2.1- G2.3	13,3%
written	Evaluation and assessment of students' understanding of the course content from Week 6 to Week 10.	Week 10	Midterm exam 2	G1.3-G1.4, G2.1- G2.3	13,3%

Homework assignments	Evaluation and assessment of students' understanding of the course content from Week 10 to Week 15.	Week 15	Homework assignment	G1.5-G1.8, G2.1- G2.3	13,3%
Question and answer	Evaluation and assessment of students' understanding of the course content from Week 1 to Week 15.	According to the schedule provided by the Training Department	the final exam for the course.	G1.1-G1.8, G2.1-G2.3	60%

- Students' responsibilities:
  - Attendance: minimum 80% of class sessions.
  - Assignments: must complete 100% of homework assigned by the instructor.
- Academic integrity:
  - Copying assignments or using internet translations detected as plagiarism will result in a deduction of 100% of the grade. In severe cases (multiple instances of copying - 3 or more similarities), the student may be barred from taking the final exam and may face further disciplinary action for facilitating plagiarism.
  - Students who fail to fulfill their responsibilities (as listed above) will be barred from taking exams and may face disciplinary action.
  - Students caught cheating during exams (either giving or receiving assistance) will be suspended or expelled.
- Grading scale: 10

5.8 GMA007 Principle of communication

5.8.1 Course name

English: Principle of communication

5.8.2 Course code: GMA007

5.8.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

5.8.4 Prerequisites

ENG104 - English for academic purposes (

5.8.5 Corequisites

None

5.8.6 Course description

"Principles of communication" is a course designed to develop the communication skills for engineering students in the context of creativity, negotiation, interpersonal and problem solving environment. The course introduces and experiences students with reading academic documents, writing technical definitions, descriptions, instructions and engineering reports. The whole attitudinal framework that enables effective and purposeful exchange of information for learning and working in engineering environment is also provided.

5.8.7 Course mission/goal/objectives

Upon completion of this course, the student should be able to explain the role of communications in an engineering environment and identify the most effective methods of creating, sending and receiving technical messages. The student should also be able to use effective oral and written communications skills in business; write and evaluate technical documents; including letters, memos, and reports using the principles of correct style, organization and format, and prepare an effective oral technical presentation in academic environment.

5.8.8 Learning outcomes

Knowledge:

After learning this course, students are able to:

- Understand how to address the rhetorical situation (audience, purpose, context) to shape the development of professional documents;
- Develop strategies for learning technical and scientific information and conducting specialized study;

- Demonstrate how to design, write, test, and revise textual and visual communication;
- Demonstrate how to integrate written content, graphics, and basic design principles in order to create usable, reader-friendly documents;
- Become familiar with and comfortable using the main genres of technical communication.

Skills:

After learning this course, students are able to:

- Analyze communication contexts rhetorically by understanding audiences, purposes, and situations;
- Create technical documents that solve problems and improve situations through communication;
- Write effective technical prose;
- Design convincing and usable documents;
- Communicative effectively with diverse audiences;
- Collaborate on communication projects;
- Capacity to learn in further study.

5.8.9 Course topics

- Analyze Communication Purpose and Audience
- Listening in engineering learning and working
- Reading in engineering learning and working
- E-Mails, Phone Calls, and Memos
- Visuals for Engineering Presentation - Engineers Think in Pictures
- Writing Grant Proposals & Engineering Reports
- Job-Application Materials
- Résumé, CV and statement of purpose
- Technical definitions, descriptions, and instructions
- Presentation, speaking and negotiation
- Team-talk, group discussion and interview

5.8.10 Course materials

Textbook

[1] John, X. Wang. *What every engineer should know about Business Communication*. CRC Press, Taylor & Francis group, 2008, ISBN-13: 978-0-8493-8396-0

Reference books:

[2] M. Markel. *Technical Communication*. 9th Ed. Boston: Bedford/St. Martin's, 2010

[3] John Harley and et al. *Reading and writing*. New York, Holt, Rinehart and Winston, 1962

5.8.11 Grading policy

Process grading: 50%

Evaluations				
5xQuiz	4xHomeworks	xPresentation	2xSeminars	Midterm Exam
50%				

Homeworks: CV, Job application letters/Statement of purpose, Emails to a boss/professor, a proposal to apply a project.
Presentations: Students choose your own topics and present at the beginning of each lecture

Final exam: 50%

Type	Writing, closed exam
Duration	90 minutes
Main topics	- Write an intruction document for an object or a process given in the exam; - Write a short proposal for an engineering problem given in the exam.

Attendance policy: Follow current policy of the AP training.

SEMESTER 6

No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
6th Semester (16 weeks + 3 weeks for exams)					
1	MAT005	Differential equations	3	3	FIT
2	EE0004	Electronic devices and applications 2	4	4	FIT
3	EE0008	Signal analysis	4	4	FIT
4	EE0006	Digital logic design	3	3	FIT
5	GEE005	Experimental methods 2	1	1	FIT
6	GEE011	Energy conversion	3	3	FIT
7	MLV102	Political economics of Marxism and Leninism *For Vietnamese students only*			DPT
Total			20 (18)	20 (18)	

6.1 MAT005 Differential equations

6.1.1 Course name

English: Differential equations

6.1.2 Course code: MAT005

6.1.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

6.1.4 Prerequisites

MAT004 - Calculus 3

6.1.5 Corequisites

None

6.1.6 Course description

Differential equations are mathematical equations that relate some functions of one or more variables with their derivatives. They provide the students a course of analytic solutions, qualitative behavior of solutions to differential equations. Topics include first-order and higher-order ordinary differential equations, including nonlinear equations, Linear systems, and Laplace transforms.

6.1.7 Course mission/goal/objectives

Differential equations are mathematically studied from several different perspectives, mostly concerned with their solutions — the set of functions that satisfy the equation. Differential Equations play an important role in pure mathematics, Physics sciences, and engineering sciences.

6.1.8 Learning outcomes

Knowledge:

- Understand the concept of existence and uniqueness of solutions of a DE, the concept of a general solution, a particular solution and initial conditions, and draw slope fields by hand and also by computer using Maple, Matlab.
- Solve 1st order DEs (both nonlinear and linear) using various techniques: integrating factor, separable DE, substitution method, exact DE.
- Solve 2nd order constant coefficient homogenous Des. use the method of undetermined coefficients to find the particular solution.
- Understand the “resonance” and “beat” phenomena. understand what the system of equations is. solve DEs using the method of elimination.

- Solve the system equation using the eigenvalues in three different cases: real distinct roots, repeated roots, and complex roots. perform the stability analysis of a linear system using eigenvalues
- Understand the definition of the Laplace Transforms to apply problems with discontinuous forcing functions.

Skills:

Apply all knowledge to solve problems about Engineering, Physics, Computer science, Biology, and Economics.

6.1.9 Course topics

- Introduction to differential equations
- First – order differential equations
- Higher – order differential equations
- The Laplace transform
- Systems of linear first-order differential equations

6.1.10 Course materials

Textbook

[1] Dennis G.Zill, Michael R.Cullen. *Differential Equations with Boundary – Value Problems*. Seventh edition

Reference books:

[2] Student solutions. *Manual for Blanchard/Devaney/Hall's Differential Equations*. 3rd Edition, Brooks Cole, ISBN-10: 0495014613, ISBN-13 978-0495014614

[3] William E. Boyce, Richard C. DiPrima. *Elementary differential equations and boundary value problems*. Ninth edition, ISBN 9780470383346

6.1.11 Grading policy

Evaluation process (50%)

Content	Form of Assessment	
	Homework and Quiz	Mid-term Exams
Linear Differential Equations, Separable Equations	10%	20%
Differences Between Linear and Nonlinear Equations		
Homogeneous Equations with Constant Coefficients		
Nonhomogeneous Equations		
Homogeneous Linear Systems with Constant Coefficients		20%
Nonhomogeneous Linear Systems		
Laplace Transforms		

Final evaluation(50%)

Form	Exam paper

Special requirement: The course description is only legal document for teaching and studying performance when it has two authorized signatures and open to all faculty members and student in E-learning page of TNUT before of teaching any classes involved.

6.2 EE0004 Electronic devices and applications 2

6.2.1 Course name

English: Electronic devices and applications 2

6.2.2 Course code: EE0004

6.2.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
60	0	0

6.2.4 Prerequisites

EE0001 - Electronic devices and applications 1

6.2.5 Corequisites

None

6.2.6 Course description

Semiconductor electronic components including MOSFETs, BJTs, JETs, and OpAmps. Emphasis on device models and use of solid state electronic devices to analyze, synthesize and design amplifiers and switching circuits. SPICE simulations are extensively utilized. Basic building blocks for analog and digital applications. Theoretical concepts and methods are demonstrated and reinforced through laboratory exercises.

6.2.7 Course mission/goal/objectives

The course aims at giving clear and simplified explanations on the physical construction, relevant characteristics, principles of operation, and applications of several currently and widely used devices in electronic industries and research fields. As far as possible, mathematics is completely avoided. However, simple mathematical analyses are made in situations as and when they are required.

6.2.8 Learning outcomes

- Design and/or analyze opamp, common transistor amplifiers (BJT and FET) and switching circuits.
- Describe and analyze; opamp, transistor and diode circuits using appropriate small or switching models.
- Use PSpice or other modern CAD tools for circuit simulation to assist in the analysis and conformation of circuit design precision.

6.2.9 Course topics

- Large and small signal siode circuits .

- DC and AC analysis of BJT and FET circuits.
- Opamp circuits analysis.
- BJT and FET differential amplifiers.
- Feedback circuit.
- CMOS digital circuits.

6.2.10 Course materials

Textbook

[1] Sedra. *Microelectronic Circuits w/CD*. Oxford

6.2.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

6.3 EE0008 Signal analysis

6.3.1 Course name

English: Signal analysis

6.3.2 Course code: EE0008

6.3.3 Course duration: 4 credits

6.3.4 Prerequisites

EE0007 - Network analysis

6.3.5 Corequisites

GEE005 - Experimental methods 2 (

6.3.6 Course description

Periodic signals. Linear time-invariant (LTI) systems. Impulse response. Convolution. Fourier series, Fourier transform. Sampling theorem. Modulation and Multiplexing.

6.3.7 Course mission/goal/objectives

The course is to provide the basic concepts, definitions, theories of signals and systems, as well as related examples and practical problems. It also helps students using Matlab to simulate and check results. Students are required to do homework themselves, to prepare well and be ready for taking quizzes randomly.

6.3.8 Learning outcomes

Knowledge:

After learning this course, students are able to:

- Compute the period of a periodic (continuous-time or discrete-time) signal.
- Perform the shift, scaling or time-reversal operation on a signal.
- Determine the system properties regarding, memory/memoryless, causality, stability, linearity, time-invariance for a given system.
- Use the impulse response of a LTI system to compute the system output given an input via convolution integral (CT) or convolution sum (DT).
- Use the impulse response of a LTI system to decide system causality and stability.
- Compute the Fourier series coefficients for a given period signal.
- Compute the continuous-time Fourier transform for both aperiodic and periodic signals.
- Apply the sampling theorem to decide the minimum sampling rate for a given band-limited signal and to reconstruct a continuous-time signal from its samples.
- Design an anti-aliasing filter to improve the sampling performance.

- Design a Frequency-division Multiplexing (FDM) communication system.

Skills:

After learning this course, students are able to:

- Analyze the periodic signals using Fourier transformation.
- Analyze the causality, stability, controllability, linearity, etc. of a system.
- Analyze the band-limited signal and reconstruct its continuous-time signals.
- Design anti-aliasing filter to improve the sampling performance.

6.3.9 Course topics

- Exponential and sinusoidal signals.
- Unit impulse and unit step functions.
- Linear time-invariant (LTI) systems.
- Impulse response of LTI systems.
- Convolution integral and convolution sum.
- Fourier series representation.
- Continuous-time Fourier transform.
- Sampling theory.
- Amplitude modulation and demodulation.
- Multiplexing and demultiplexing.

6.3.10 Course materials

Textbook

[1] Alan V. Oppenheim, Alan S. Willsky, Ian T. Young. *Signal and Systems*. 8th Edition, 1997

6.3.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

6.4 EE0006 Digital logic design

6.4.1 Course name

logic English: Digital logic design

6.4.2 Course code: EE0006

6.4.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

6.4.4 Prerequisites

EE0001 - Electronic devices and applications 1

6.4.5 Corequisites

None

6.4.6 Course description

Boolean algebra, optimization of logic networks. Design using SSI, and MSI, LSI components. ROM and PLA applications. Analysis and design of clock sequential logic networks. Flip-flops, counters, registers. A synchronous circuit design and analysis. Laboratory experience in implementing combinational and sequential logic devices.

6.4.7 Course mission/goal/objectives

This course provides a modern introduction to logic design and the basic building blocks used in digital systems, in particular digital computers. It starts with a discussion of combinational logic: logic gates, minimization techniques, arithmetic circuits, and modern logic devices such as field programmable logic gates. The second part of the course deals with sequential circuits: flip-flops, synthesis of sequential circuits, and case studies, including counters, registers, and random access memories. State machines will then be discussed and illustrated through case studies of more complex systems using programmable logic devices. Different representations including truth table, logic gate, timing diagram, switch representation, and state diagram will be discussed.

6.4.8 Learning outcomes

Having completed this course, students will be able to:

- Analyze Boolean algebra and be able to translate this into hardware.
- Analyze and simplify hardware for combinational sequential logic.
- Analyze algorithmic complexity of digital logic.
- Assess delay area and power considerations for digital logic .
- Be able to synthesize and build hardware for digital basic into its realizable output.

6.4.9 Course topics

- Number systems.
- Boolean algebra.
- Simplification of Boolean Algebra.
- Combinational logic (2-level designs).
- Sequential logic.
- Digital system design.
- Synthesis of digital systems.

6.4.10 Course materials

Textbook

[1] Harris. *Digital design and computer architecture*. current edition, Morgan Kaufmann

6.4.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

6.5 GEE005 Experimental methods 2

6.5.1 Course name

2 English: Experimental methods 2

6.5.2 Course code: GEE005

6.5.3 Course duration: 1 credits

Lecture hours	Practice hours	Laboratory hours
0	15	0

6.5.4 Prerequisites

EE0007 - Network analysis

6.5.5 Course description

Second laboratory in electrical measurements and instrumentation techniques and devices. Frequency response using gain/phase meter. Identification of unknown two-port networks, steady state operation and linear networks. Reinforces EE0007 and continues with the design of networks.

6.5.6 Course mission/goal/objectives

Provide the students with the knowledge and skills required to design, build and validate the first and second order circuit, after simulating using some simulation tools such as PSPICE, Multisim. . . In addition, with this course the students will be able to learn how to identify unknown two-port networks as well as compute the time-constant of a two-port network.

6.5.7 Learning outcomes

Having completed this course, students will be able to:

- Be able to use gain/phase meter.
- Be able to analyze circuit using simulation tools such as PSPICE.
- Be able to design, build and validate a 1st-order circuit.
- Be able to design, build and validate a 2nd-order circuit.
- Be able to measure the time-constant of a two-port network.
- Be able to design a circuit using op-amp.
- Be able to build and debug a passive filter.
- Be able to build and debug an active filter.

6.5.8 Course topics

Topics covered:

- PSPICE
- MATLAB
- Gain/phase meter
- RL and RC circuit—-time constant
- RLC circuit—step response
- RLC circuit: frequency-response
- Non-linearity and harmonics
- Active filter design

6.5.9 Course materials

Textbook

[1] . *Laboratory manual*.

Reference books:

[2] Charles K. Alexander, Matthew N. O. Sadiku, Kenneth C. Smith. *Fundamentals of electrical circuit*. 5th Edition

6.5.10 Grading policy

Process valuation: 60%

Midterm exams: 60%

Final evaluation: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

6.6 GEE011 Energy conversion

6.6.1 Course name

English: Energy conversion

6.6.2 Course code: GEE011

6.6.3 Course duration: 3 credits

6.6.4 Prerequisites

MAT004 - Calculus 3
EE0007 - Network analysis

6.6.5 Corequisites

None

6.6.6 Course description

Physical principles of electromagnetic and electromechanical energy conversion devices and their application to conventional transformers and rotating machines. Network and phasor models; steady-state performance.

6.6.7 Course mission/goal/objectives

The course presents the principles of conversion of energies from one form to another as well as of not only the basic operation of electrical machines but also their practical applications. This course assists students in range of further studies such as Power Electronics, Automatic control, Power system analysis, etc.

6.6.8 Learning outcomes

- Be able to apply fundamental electric and magnetic circuit models to energy conversion devices.
- Model the operation steady state of AC and DC motors

6.6.9 Course topics

- Introduction to Energy Conversion.
- Steady-state 1 ph. and 3 ph. circuits, power calculations.
- Magnetic Circuits.
- Transformers – steady state operation, equivalent circuits.
- Three-phase connections.
- Electromechanical Energy.
- Conversion fundamentals.
- DC machines – steady state operation, applications.

- Synchronous Machines (round-rotor) in steady state.
- Equivalent circuits, power angle characteristic.
- Three-phase Induction Motor – steady state.
- Operation, equivalent circuits.
- Single-phase Induction Motors.

6.6.10 Course materials

Textbook

[1] Z. Yamayaa and J. Bala. *Electromechanical Energy Devices and Power Systems*. John Wiley

Reference books:

6.6.11 Grading policy

Process valuation: 60%

Homework:	15%
Midterm exams:	30%
Quiz:	15%

Final evaluation: 40%

Type: Writing

Attendance policy: Following current policy of the AP training.

6.7 MLV102 Political economics of Marxism and Leninism

6.7.1 Course name

English: Political economics of Marxism and Leninism

6.7.2 Course code: MLV102

6.7.3 Course duration: 2 credits

Lecture hours	Practice hours	Laboratory hours
30	0	0

6.7.4 Prerequisites

MLV101 - Philosophy of Marxism and Leninism

6.7.5 Corequisites

None

6.7.6 Course description

The curriculum consists of 6 chapters: Chapter 1 discusses the subject matter, research methods, and the function of Marxist-Leninist Political Economy. From Chapter 2 to Chapter 6, the core content of Marxist-Leninist Political Economy is presented according to the objectives of the course. Specifically, such as: Commodities, markets, and the roles of subjects in the market economy. Surplus value production in the market economy; Competition and monopoly in the market economy; Socialist-oriented market economy and economic interest relations in Vietnam; Industrialization, modernization, and Vietnam's economic integration into the international economy.

6.7.7 Course mission/goal/objectives

Goals	Goal description	Standard output
G1	Equip students with the fundamental and core knowledge of Marxist-Leninist Political Economy in the context of the economic development of the country and the world today. Ensure fundamental, systematic, scientific, and updated knowledge, linked to practical situations, creativity, critical thinking skills, learner qualities, connectivity, overcoming duplication, enhancing integration, and reducing workload, eliminating irrelevant content or content that is overly theoretical for students in colleges and universities not specializing in theory.	

G2	Foster the development of critical thinking skills and the ability to assess and recognize the essence of economic interest relations in the socio-economic development of the country. This contributes to helping students build appropriate social responsibilities in their future employment positions and lives after graduation.	
G3	Contribute to building students' understanding and adherence to the Marxist-Leninist ideology.	

6.7.8 Program Learning outcomes

Goals	Standard output	Goal description	Degree
G1	G1.1	Presenting the object, research method, and function of Marxist-Leninist Political Economy	I
	G1.2	Presenting Marx's theory on commodity production and commodities; market and the role of market participants	T,U
	G1.3	Presenting the fundamental content of the theory of surplus value	T,U
	G1.4	Presenting the issues of competition and monopoly in the market economy	T,U
	G1.5	Presenting the content of the socialist-oriented market economy and economic interest relations in Vietnam	T
	G1.6	Presenting the issues of industrialization, modernization, and international economic integration of Vietnam	T,U
G2	G2.1	Possess the ability to think critically, evaluate, and recognize the essence of economic interest relations in the socio-economic development of the country and some political-economic issues of the world.	T
	G2.2	Identify the role of employment and personal responsibility for the future of the country after graduation.	T,U
	G2.3	Have the capability to apply the knowledge learned to the study of Ho Chi Minh Thought and the History of the Vietnamese Communist	T,U

		Party.	
G3	G3.1	Hold a correct worldview, possess strong political integrity, and maintain steadfast belief in the principles of Marxist-Leninist political economy.	U
	G3.2	Possessing a correct attitude and professional ethics, being self-conscious in participating in the process of economic construction and promoting economic development.	U

6.7.9 Course topics

No	Contents	Standard output
1	Object, research method, and function of Marxist-Leninist Political Economy	G1.1
2	Commodities, markets, and the roles of market participants	G1.2 G2.1
3	Surplus value in the market economy	G1.3,G2.1,G2.2, G2.3,G3.1
4	Competition and monopoly in the market economy	G1.4, G2.1
5	Socialist-oriented market economy and economic interest relations in Vietnam	G1.5, G2.1, G2.2,G2.3, G3.1,G3.2
6	Industrialization, modernization, and international economic integration of Vietnam	G1.6, G2.1, G2.2,G2.3, G3.1,G3.2

6.7.1 Course materials

Textbook

[1] Giáo trình Kinh tế chính trị Mác – Lênin. *Bộ Giáo dục và Đào tạo, NXB Chính trị Quốc gia, Hà Nội*. 2019

Reference books:

[2] Jeremy Rifkin. *Cuộc cách mạng công nghiệp lần thứ ba, bản dịch tiếng Việt*. NXB Lao động xã hội, Hà Nội, 2014

[3] Manfred B Steger. *Toàn cầu hóa*. NXB Tri thức, Hà Nội, 2011

[4] Klaus Schwab. *Cách mạng công nghiệp lần thứ tư (Bộ ngoại giao dịch và hiệu đính)*. NXB Chính trị quốc gia - Sự thật, 2018, Hà Nội, 2015
6.7.10

6.7.11 Grading policy

Form	Contents	Time	Tool	Standard output	Rate %

Written (1 period)	Chapter 1: Object, research method, and function of Marxist-Leninist Political Economy Chapter 2: Commodities, markets, and the roles of market participants Chapter 3: Surplus value in the market economy	Tuần 5	Bài kiểm tra quá	G1.1, G1.2, G1.3, G2.1	13,3%
Written (1 period)	Chapter 4: Competition and monopoly in the market economy Chapter 5: Socialist-oriented market economy and economic interest relations in Vietnam	Tuần 10	Bài kiểm tra quá	G1.4, G1.5, G2.1, G2.2, G2.3, G3.1	13,4%
Homework assessment	From Chapter 1 to Chapter 6: Industrialization, modernization, and international economic integration of Vietnam	Tuần 15	Bài nộp	G1.6, G3.2	13,3%
Question and answer	End-of-course assessment	Cuối kỳ			60%

- Students' responsibilities:
  - Attendance: minimum 80% of class sessions.
  - Assignments: must complete 100% of homework assigned by the instructor.
- Academic integrity:
  - Copying assignments or using internet translations detected as plagiarism will result in a deduction of 100% of the grade. In severe cases (multiple instances of copying - 3 or more similarities), the student may be barred from taking the final exam and may face further disciplinary action for facilitating plagiarism.
  - Students who fail to fulfill their responsibilities (as listed above) will be barred from taking exams and may face disciplinary action.
  - Students caught cheating during exams (either giving or receiving assistance) will be suspended or expelled.
- Grading scale: 10

SEMESTER 7

No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
7th Semester (16 weeks + 3 weeks for exams)					
1	EE0017	Introduction to Digital Signal Processing	3	3	FIT
2	MAE017	Random signals and noise	3	3	FIT
3	EE0009	Senior design 1	3	3	FIT
4	EE0010	Systems analysis	4	4	FIT
5	EE0005	Linear electronics circuit design	3	3	FIT
6	EE0015	Power system analysis and design	3	3	FIT
7	MLV005	Scientific socialism . *For Vietnamese students only*	2	2	DPT
8	GMA002	Introduction to engineering drawing and CAD . *For foreign students only*	(4)	(4)	FIT
Total			21 (23)	21 (23)	

7.1 EE0017 Introduction to Digital Signal Processing

7.1.1 Course name

English: Introduction to Digital Signal Processing

7.1.2 Course code: EE0017

7.1.3 Course duration: credits

7.1.4 Prerequisites

MAT004 - Calculus 3
EE0007 - Network analysis
MAT005 - Differential equations

7.1.5 Corequisites

None

7.1.6 Course description

Introduction to discrete signals and linear systems using difference equations, z transforms, and discrete Fourier transforms. Design of digital filters. Sampling theorems. Multirate DSP techniques. Applications of DSP in theory and practice. MATLAB programming of DSP applications.

7.1.7 Course mission/goal/objectives

This course provides a comprehensive introduction to digital signal processing fundamentals and applications. The course also enables students to apply digital signal processing concepts to their future studies and to make it possible for them to study more advanced topics and applications.

7.1.8 Learning outcomes

- Be able to draw connections between techniques of analysis of continuous-time and discrete-time signals and systems.
- Be able to apply the discrete Fourier transform to determine the spectrum and solve input/output relations for signals and linear systems.
- Be able to represent and analyze discrete-time signals and systems in terms of difference equations and z transforms.
- Be able to design, implement, and analyze discrete time linear systems using standard FIR and IIR techniques.
- Be able to sample band limited continuous-time signals and to resample discrete-time signals.
- Be able to use MATLAB to solve DSP problems.

7.1.9 Course topics

- Fundamentals of Discrete-Time Signals and Systems.
- Discrete-Time Linear Convolution and Circular Convolution.
- Difference Equations, Impulse Responses, and Frequency Responses.
- z Transform.
- Discrete-Time Fourier Transform and Series.
- Discrete Fourier Transform.
- Discrete Cosine Transform.
- FIR and IIR Filters.
- Sampling of Continuous-Time Signals.
- Digital Resampling.
- An Introduction to Multirate DSP.
- MATLAB Design Project.

7.1.10 Course materials

Textbook

[1] Ludeman. *Fundamentals of Digital Signal Processing*. current edition, John Wiley

Reference books:

None

7.1.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

7.2 GEE007 Random signals and noise

7.2.1 Course name

English: Random signals and noise

7.2.2 Course code: GEE007

7.2.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

7.2.4 Prerequisites

EE0008 - Signal analysis
EE0007 - Network analysis

7.2.5 Corequisites

None

7.2.6 Course description

Random signals and noise is mainly committed to theory, which however, can be of good predictive value. With a strong mathematical grounding and many examples, problems, random signals and noise gives the student the knowledge of probability, random variable, random function and random process.

7.2.7 Course mission/goal/objectives

This course gives to either junior or senior engineering students the principles of probability, random variables, and random signals.

7.2.8 Learning outcomes

Knowledge:

After learning this course, students are able to:

- Compute probabilities when needed.
- Compute means, variances and moments of a random variance.
- Determine output PDF given input PDF and simple electrical transformation (system).
- Determine when experiments are SI.
- Compute PDF of sum of 2 SI random variables.
- Compute simple autocorrelation or spectral density functions.

Skills:

After learning this course, students are able to:

- Manipulate the random variable;
- Analyze the risk, uncertainty and its relevance;
- Apply the theory of random process in practical problems;
- Analyse the system with random inputs;
- Design the filter to monitor the noise of systems.

7.2.9 Course topics

- Introduction to probability.
- Random variables.
- Density and distribution functions (examples include Gaussian, uniform, and others).
- Expectations on random variables.
- Transformations of a random variable.
- Multiple random variables and their functions.
- Statistical independence.
- Distributions of a sum of random variables.
- Central limit theorem.
- Operations on multiple random variables.
- Introduction to random process.
- Spectral characteristics of random processes.
- Linear systems with random inputs.
- Noise bandwidth.

7.2.10 Course materials

Textbook

[1] Peyton Z.Peebles. *Probability, Random Variables and Random Signal Principles*. 4th edition

Reference books:

7.2.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

7.3 EE0009 Senior design 1

7.3.1 Course name

English: Senior design 1

7.3.2 Course code: EE0009

7.3.3 Course duration: 3 credits

7.3.4 Prerequisites

EE0007 - Network analysis
EE0001 - Electronic devices and applications 2
EE0006 - Digital logic design

7.3.5 Corequisites

None

7.3.6 Course description

Senior design 1 is the course that complete design cycle for several small design projects, each including establishing objectives, synthesis, analysis, construction, testing and evaluation. Use of modern lab equipment and fabrication techniques. Development of communication skills.

7.3.7 Course mission/goal/objectives

Synthesis and apply the education and skills developed in the previous subjects to complete this course.

7.3.8 Learning outcomes

Having completed this course, students will be able to:

- Function on a team put together to accomplish a specific task as measured by both peer evaluations and accomplishing tasks assigned by the team.- Analyze operation of rectifiers, inverters, regulators, choppers, and switches.
- Apply skills in electronic simulation, fabrication, or testing in the construction of an electronic device.
- Apply project management skills through creating a block diagram, Gantt chart, and work breakdown structure for a complex project.
- Write a report on an engineering project that meets professional standards.
- Design, measure specifications of, and report on an engineering subsystem that will be integrated into a larger device.
- Integrate multiple electronic subsystems into a functional whole.

7.3.9 Course topics

- Electronic fabrication techniques
- Functional decomposition
- Engineering design teams
- Technical communication
- Integration of subsystems, including software and hardware
- Electronic circuit CAD.

7.3.10 Course materials

Textbook

[1] Ford and Coulston. *Design for electrical and computer engineers*.

Reference books:

7.3.11 Grading policy

Final evaluation: 100%

Type	Defend
Duration	30 mins
Main topics	Presentation and defend.

7.4 EE0010 System analysis

7.4.1 Course name

English: System analysis

7.4.2 Course code: EE0010

7.4.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
60	0	0

7.4.4 Prerequisites

MAT004 - Calculus 3
MAT005 - Differential equations EE0007 - Network analysis

7.4.5 Corequisites

None

7.4.6 Course description

Physical and mathematical modeling of electrical and mechanical dynamic systems. Transient response of first-and second-order systems. Laplace transform techniques for solving differential equations, transfer functions, frequency response and resonance.

7.4.7 Course mission/goal/objectives

This course provides students basic techniques for analysis and design of controlled systems applicable in any industry. Both time-domain and frequency-domain methods will be presented in the course. This course should benefit students in several other fields who will use control theory in related studies.

7.4.8 Learning outcomes

- Write system equations for electrical and mechanical systems
- Convert system representations among differential equations
- Obtain the Laplace Transform for LTI system differential equations
- Obtain solution of system equations via Laplace transform
- Ability to simulate Dynamic Systems
- Analysis/design stability conditions using Root-Locus techniques
- Analysis/design 1st and 2nd order system response in Time domain
- Analysis/design 1st and 2nd order system response in Frequency domain

7.4.9 Course topics

- Introduction to Dynamic Systems
- Modeling of Electrical Circuits and Mechanical Sys terms
- Deriving Mathematical model in Differential Equations
- Mathematical models in s-domain
- Introduction to Laplace Transform
- Transfer Function Approach
- Simulation of Dynamic Systems
- Frequency Domain Response
- Introduction to Control Systems
- Stability of feedback control systems

7.4.10 Course materials

Textbook

[1] J. L. Shearer and B.T. Kulakowski. *Dynamic Modeling and Control of Engineering Systems*. Macmillan Publishing Company, New York, 1990

[2] Katsuhiko Ogata. *System Dynamics*. Pearson, Prentice Hall, New Jersey, 2004

7.4.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

7.5 EE0005 Linear electronics circuit design

7.5.1 Course name

English: Linear electronics circuit design

7.5.2 Course code: EE0005

7.5.3 Course duration: credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

7.5.4 Prerequisites

EE0004 - Electronic devices and applications 2

7.5.5 Corequisites

None

7.5.6 Course description

Study of the circuit building blocks utilized in CMOS and BJT integrated circuits; differential and multistage amplifiers and output stages. Topics related to amplifier circuits; such as bias, small-signal operation, frequency response, stability, and feedback are covered. Emphasis is on preparation for the practice of electronics design and for more advanced courses on analog integrated circuit design.

7.5.7 Course mission/goal/objectives

This course helps students to be more effective in designing discrete and integrated circuits by helping them understand the role of analog devices in their circuit design. Analog elements are at the heart of many important functions in both discrete and integrated circuits, but from a design perspective the analog components are often the most difficult to understand. Examples include operational amplifiers, D/A and A/D converters and active filters. Effective circuit design requires a strong understanding of the operation of these analog devices and how they affect circuit design.

7.5.8 Learning outcomes

- Be able to recognize different types of single-stage amplifiers and to compare cons and pros
- Be able to identify each amplification stage in a multi-stage amplifier and to understand the functionality of each stage
- Be able to calculate the gain and the input/output impedance of single- and multi-stage amplifiers
- Be able to analyze the frequency response of single- and multi-stage amplifiers

- Be able to distinguish different feedback topologies in amplifiers and understand the basic functionality of each scheme.
- Be able to use simulation software packages to analyze amplifier circuits.

7.5.9 Course topics

- Single-stage amplifiers
  - Bias
  - Frequency response
  - Cascode amplifier
- Differential and multi-stage amplifiers
  - MOS and BJT differential pairs
  - Active loads
  - Frequency response
- Feedback
  - Basic feedback topologies
  - Loop gain
  - Input/output impedance
  - Frequency response
- Output stages
  - Classification
  - Power efficiency
  - Bias

7.5.10 Course materials

Textbook

[1] Sedra. *Microelectronic circuits*. Oxford

Reference books:

7.5.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

7.6 EE0015 Power system analysis and design

7.6.1 Course name

English: Power system analysis and design

7.6.2 Course code: EE0015

7.6.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

7.6.4 Prerequisites

EE0007 - Network analysis

7.6.5 Corequisites

None

7.6.6 Course description

Power system component models from circuit theory. Formulation and design of the load flow model and the optimum economic generator allocation problem utilizing computer methods.

7.6.7 Course mission/goal/objectives

This course provides students a systematic knowledge and understanding of the mathematics and engineering knowledge required for the analysis and design of electrical power systems. This course also exposes students to the real world applications of electrical power engineering.

7.6.8 Learning outcomes

- Be able to model components of power delivery systems from fundamental circuit theory
- Analyze the operation of components operating within a power system
- Perform load-flow analysis

7.6.9 Course topics

- Overview of power systems
- Review of phasors
- Network analysis, Ybus representation
- Computer solution of linear algebraic equations
- Analysis of balanced 3-phase systems

- Transformers, per-unit analysis
- Power transmission line models and analysis
- Iterative methods for solution of nonlinear algebraic equations
- Load flow analysis; fast-decoupled load flow

7.6.10 Course materials

Textbook

[1] Glover/Sarma. *Power system analysis and design*. 4rd edition, PWS

[2] Bergen/Vittal. *Power systems analysis*. 2nd edition, Prentice Hall

7.6.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

7.7 MLV005 Scientific socialism

7.7.1 Course name

English: Scientific socialism

7.7.2 Course code: MLV005

7.7.3 Course duration: 2 credits

Lecture hours	Practice hours	Laboratory hours
30	0	0

7.7.4 Prerequisites

MLV102 - Political economics of Marxism and Leninism

7.7.5 Corequisites

None

7.7.6 Course description

The course Scientific socialism is a compulsory subject arranged to be studied after the course Political Economy of Marx and Lenin in the training program for non-majoring students of Marx and Lenin thought.

The content of the course consists of 7 chapters: Chapter 1 presents the fundamental introductory issues of Scientific Socialism; from Chapter 2 to Chapter 7, the basic contents of Scientific Socialism are presented, including issues such as: The historical mission of the working class; Socialism and the transitional period to socialism; Socialist democracy and the socialist state; Social structure - classes and class alliances, layers in the transitional period to socialism; Issues of nationality, religion, and family in the transitional period to socialism.

7.7.7 Course mission/goal/objectives

Goals	Goal description	Standard output
G1	Students grasp the basic and core knowledge of Scientific Socialism, one of the three components of Marxism-Leninism.	
G1	Students enhance their capacity to understand practical realities and apply the aforementioned knowledge to examine and evaluate political and social issues of the country related to socialism and the path towards socialism in Vietnam.	

G1	Students demonstrate a correct political attitude and ideology towards the course of Scientific Socialism specifically, and the ideological foundation of the Communist Party of Vietnam in general.	

7.7.8 Learning outcomes

Goals	Standard output	Goal description	Degree
G1	G1.1	Students have a basic and systematic understanding of the emergence and developmental stages; the subject, methods, and significance of studying Scientific Socialism, one of the three components constituting Marxism-Leninism.	I
	G1.2	Students grasp the fundamental viewpoints of Marxism-Leninism regarding the working class and the historical mission of the working class, as well as the content, manifestation, and significance of that mission in the current context.	T,U
	G1.3	Students acquire basic knowledge of the viewpoints of Marxism-Leninism regarding socialism, the period of transition to socialism, and the creative application of the Communist Party of Vietnam in specific Vietnamese conditions.	T
	G1.4	Students have a full and accurate understanding of the nature of socialist democracy and socialist state, both in general and in Vietnam in particular.	T
	G1.5	Students grasp the foundational knowledge about the social structure - classes and class alliances, social strata during the period of transition to socialism.	T
	G1.6	Students comprehend the basic viewpoints of Marxism-Leninism regarding ethnic and religious issues; the relationship between ethnic groups and religions; and the content of ethnic and religious policies of the Communist Party and the Vietnamese State.	T

	G1.7	Students understand the basic viewpoints of Marxism-Leninism, Ho Chi Minh's ideology, and the Communist Party of Vietnam regarding the family, family construction during the period of transition to socialism, and family building in present-day Vietnam.	T,U
G2	G2.1	Students develop their critical thinking skills and ability to argue objectively and convincingly about the subject and object of study in a scientific field, as well as in various research topics. They can differentiate political and social issues in real-life situations.	T
	G2.2	They are able to apply the methodology and research methods of scientific socialism to analyze the historical mission of the Vietnamese working class in the process of the Vietnamese revolution, as well as in the tasks of innovation and international integration today.	T
	G2.3	Students can apply theories of socialism, the period of transition, socialist democracy, and family issues during the transition period to analyze practical issues, especially in their personal work and responsibilities.	T
	G2.4	They possess the skills to identify changes in social structure - classes and the content of class alliances in our country during the transition to socialism, as well as issues related to ethnic groups and changes in religion during the transition to socialism in Vietnam.	T
G3	G3.1	Students demonstrate a positive attitude towards studying political theory courses and have confidence in the goals, ideals, and success of the renewal process initiated and led by the Communist Party of Vietnam.	T
	G3.2	They contribute to building and strengthening the scientific belief and the proletarian standpoint towards the socialist construction worldwide as well as in Vietnam.	U
	G3.3	Students affirm their belief in the socialist regime, always trusting and supporting the renewal direction towards socialist orientation under the leadership of the Communist Party of Vietnam.	U

	G3.4	Students identify their own responsibility to contribute to propaganda efforts, implement the Party's directives and guidelines, as well as comply with the policies and laws of the State. They exhibit appropriate attitudes and behaviors in perception and take responsibility for building their families and fostering relationships between individuals, families, and society.	U

7.7.9 Course topics

No	Contents	Standard output
1	Content 1: Introduction to Scientific Socialism	G1.1; G2.1; G3.1
2	Content 2: Historical Mission of the Working Class	G1.2; G2.2; G3.2; G3.3
3	Content 3: Socialism and the Period of Transition to Socialism	G1.3; G2.3; G3.2; G3.3
4	Content 4: Socialist Democracy and the Socialist State	G1.4; G2.3; G3.2; G3.3
5	Content 5: Social Structure - Class and Class Alliance, Strata during the Transition to Socialism	G1.5; G2.2; G2.4; G3.2; G3.3
6	Content 6: Ethnic and Religious Issues during the Transition to Socialism	G1.6; G2.3; G2.4; G3.4
7	Content 7: Family Issues during the Transition to Socialism	G1.7; G2.3; G3.4

7.7.1 Course materials

Textbook

[1] Bộ Giáo dục và Đào tạo. *Giáo trình Chủ nghĩa xã hội khoa học*. NXB Chính trị Quốc gia - Hà Nội, 2019

Reference books:

[2] Bộ Giáo dục và Đào tạo. *Giáo trình Chủ nghĩa xã hội khoa học*. NXB Chính trị Quốc gia - Hà Nội, 2006

[3] Học viện Chính trị Quốc gia Hồ Chí Minh. *Giáo trình Chủ nghĩa xã hội kho học*. NXB Lý luận chính trị - Hà Nội, 2018

7.7.10 Grading policy

Form	Contents	Time	Tool	Standard output	Rate %
Written (1 period)	Chapter 1: Introduction to Scientific Socialism Chapter 2: Historical Mission of the Working Class Chapter 3: Socialism and the Period of Transition to Socialism	Week 5	Progress test	G1.1, G1.2, G1.3, G2.1, G2.2, G2.3, G3.1; G3.2,	13,3%
Written (1 period)	Chapter 4: Socialist Democracy and the Socialist State Chapter 5: Social Structure - Class and Class Alliance, Strata during the Transition to Socialism	Week 10	Progress test	G1.4; G1.5: G2.3; G2.4; G3.2; G3.3	13,4%
Home work assessment	Chapter 6: Ethnic and Religious Issues during the Transition to Socialism Chapter 7: Family Issues during the Transition to Socialism	Week 15	Submitted homework	G1.6; G1.7; G2.3; G2.4; G3.3; G3.4	13,3%
Question and answer	Entire Content of the Subject "Scientific Socialism"	Final term	Final exam		60%

- Students' responsibilities:
  - Attendance: minimum 80% of class sessions.
  - Assignments: must complete 100% of homework assigned by the instructor.
- Academic integrity:
  - Copying assignments or using internet translations detected as plagiarism will result in a deduction of 100% of the grade. In severe cases (multiple instances of copying - 3 or more similarities), the student may be barred from taking the final exam and may face further disciplinary action for facilitating plagiarism.
  - Students who fail to fulfill their responsibilities (as listed above) will be barred from taking exams and may face disciplinary action.
  - Students caught cheating during exams (either giving or receiving assistance) will be suspended or expelled.
- Grading scale: 10

7.8 GMA002 Introduction to engineering drawing and CAD

7.8.1 Course name

Vẽ CAD

English: Introduction to engineering drawing and CAD

7.8.2 Course code: GMA002

7.8.3 Course duration: 4 credits

Lecture hours	Practice hours	Laboratory hours
60	0	0

7.8.4 Prerequisites

None

7.8.5 Corequisites

None

7.8.6 Course description

Engineering drawing is a basic course for all undergraduate Engineering program. Though engineering drawing is considered as the language of engineers, most of the universities offer this course as a practical course without any lecture component. This course is therefore introduced to provide the basic understanding of the fundamentals of Engineering Drawing, mainly visualization, graphics theory, standards and conventions of drawing, the tools of drawing and the use of drawings in engineering applications.

7.8.7 Course mission/goal/objectives

This course is the studying about how to communication in technical by drawing. It provides the knowledge connecting basic subjects to specified subjects. After finishing this course, student may get closer to engineering task.

7.8.8 Learning outcomes

Knowledge:

- Develop a basic understanding of codes, standards and theories common to engineering drawing
- Basic fundamental knowledge and how to create engineering drawing

Skills:

- Freehand and using instrument engineering drawing;
- Using AutoCAD to create technical drawings.

7.8.9 Course topics

This course will provide the student the opportunity to study the following topics: Fundamental principles of orthographic projection theory to provide graphical solutions of descriptive geometry problems dealing with the spatial relation of points, lines and planes; Techniques of Technical Sketching; Auxiliary views; Sectional views; Dihedral Angels; Design concepts; A study manufacturing processes; Calculation of Tolerances; Limits and Fits and selected technical terminology required to produce production drawings; Standards and Conventions of size, shape description and Fastener and Thread representation.

7.8.10 Course materials

Textbook

[1] . *Introduction to Engineering Drawing*. Custom Edition for University at Buffalo

Reference books:

[2] O Ostrouwsky, Edward Arnold. *Engineering Drawing with CAD Applications*.

[3] Rhodes & Cook. *Basic Engineering Drawing*. Pitman

[4] Warren J.Luzadder. *Fundamentals of Engineering Drawing for design, communication and numerical control*. Six Edition

7.8.11 Grading policy

Attendance:	10%
Quiz and tests:	20%
Midterm exams:	20%
Final exam:	50%

Any student who misses 20% or more of the course risks failure in the course

SEMESTER 8

No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
8th Semester (16 weeks + 3 weeks for exams)					
1	GEE006	Experimental methods 3 3	1	1	FIT
2	EE0013	Communication electronics	3	3	FIT
3	GEE008	Communication theory	3	3	FIT
4A	EE0018	Microwave engineering *Elective*	3	3	FIT
4B	GMA005	Higher level language *Elective*			
5	EE0016	Senior design 2	3	3	FIT
6	EE0012	Power electronics	3	3	FIT
7	EE0014	Digital electronics circuit design	3	3	FIT
8	MLV103	History of Vietnamese communist party *For Vietnamese students only*	2	2	DPT
9	GMA004	Introduction to MAE Practice *For foreign students only*	(3)	(3)	FIT
Total			21 (22)	21 (22)	

8.1 GEE006 Experimental methods 3

8.1.1 Course name

3 English: Experimental methods 3

8.1.2 Course code: GEE006

8.1.3 Course duration: 1 credits

Lecture hours	Practice hours	Laboratory hours
0	15	0

8.1.4 Prerequisites

EE0004 - Electronic devices and applications 2 (2

8.1.5 Corequisites

None

8.1.6 Course description

Third laboratory in electrical measurements and instrumentation techniques and devices. Become familiar with the use of transistor curve tracers, transistor operating points and application related models. This includes the behavior of simple BJT and FET amplifiers and switching circuits, operational amplifiers and feedback circuits. The lab reinforces EE0001, continuing the design experience in the context of electronics, continuing the design experience in the context of electronics.

8.1.7 Course mission/goal/objectives

Experimental Methods III is taught for fourth year students after completing Electronic Devices and Applications I and II courses. This course will fortify the knowledge and provide the skills required to analyze and design some of the electronic circuits through a series of experiments. With this course, students will be able to learn the entire process of putting theoretical knowledge into practice.

8.1.8 Learning outcomes

Having completed this course, students will be able to:

- Construct circuits from op-amp, BJT and MOSFET components to a performance objective.
- Verify constructed circuits via circuit simulators i.e. SPICE and laboratory testing.
- Design and contrast current sources, amplifiers, and power supplies.
- Design and contrast simple amplifiers using BFTs, FETs and opamps, including feedback.
- Design and build digital circuits from CMOS components.

8.1.9 Course topics

Topics covered:

- I-V Characteristics of Diode.
- Diode Rectifier Circuits.
- I-V Characteristics of BJT and MOSFET.
- BJT Amplifiers.
- MOSFET Amplifiers.
- Differential Amplifiers.
- Op-Amp Circuits.
- Feedback Circuit.

8.1.10 Course materials

Textbook

[1] . *Laboratory Manual of LJ CREATE*.

Reference books:

[2] Adel S. Sedra, Kenneth C. Smith. *Microelectronic Circuits*. 5th Edition

8.1.11 Grading policy

Process valuation: 60%

Midterm exams: 60%

Final evaluation: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

8.2 EE0013 Communication electronics

8.2.1 Course name

English: Communication electronics

8.2.2 Course code: EE0013

8.2.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

8.2.4 Prerequisites

EE0004 - Electronic devices and applications 2

8.2.5 Corequisites

GEE006 - Experimental methods 3 (3)

8.2.6 Course description

Communication electronics focuses on design filters and implement modulation method using electronic components.

8.2.7 Course mission/goal/objectives

This course is not only gives to student basic knowledge of filters and modulation methods but also provides students chances to design and analyze in real circuits.

8.2.8 Learning outcomes

Having completed this course, students will be able to:

- Design and analyze passive band pass tuning circuits, amplifiers, oscillators, and modulators.
- Design and analyze AM, PM, and FM communication systems.

8.2.9 Course topics

- Design passive bandpass tuning circuits (for receivers) given resonant frequency, bandwith and power transfer constraints.
- Analyze high frequency bandpass amplifiers using the Linville Factor for stability considerations, and the complex Y, H, or S parameters for analysis.
- Use a power FET to design a RF transmitter, with specified carrier frequency, antenna impedance, efficiency, and antenna power.
- The design of phase shift, tank circuit, and crystal controlled oscillators.

- Phase locked loop circuit analysis (Gilbert Gain Cell multipliers, low pass filters, and voltage controlled oscillators.
- Mixers and balanced modulators.
- Analysis and characteristics of AM, PM, and FM communication systems.
- AM receiver and Transmitter circuits.
- FM transmitter and receiver circuits.

8.2.10 Course materials

Textbook

[1] Krauss. *Solid State Radio Engineering*. John Wiley

Reference books:

8.2.11 Grading policy

Process valuation: 60%

Homework:	15%
Midterm exams:	30%
Quiz:	15%

Final evaluation: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

8.3 GEE008 Communication theory

8.3.1 Course name

English: Communication theory

8.3.2 Course code: GEE008

8.3.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

8.3.4 Prerequisites

EE0008 - Signal analysis
GEE007 - Random signals and noise

8.3.5 Corequisites

None

8.3.6 Course description

This course provides the fundamental theory of the basic building blocks that exist in all communication systems.

8.3.7 Course mission/goal/objectives

This course is concerned with signal and system in the communication field. Methods of analog modulation such as AM, FM, PM also are included as well as ASK, FSK, PSK, QAM in digital communication.

8.3.8 Learning outcomes

Having completed this course, students will be able to analyze and synthesize signals and noise in communications systems:

- Have experience with common digital modulation techniques.
- Be able to analyze the effect of noise on system performance, and allow for receiver design.
- Be able to verify sampling theorem and implement A/D/A converters and recent modem technology.

8.3.9 Course topics

- Review of analog modems (AM and FM).
- Digital modem technology (ASK, FSK, PSK, QAM)
- Multiplexing and Multiple Access (TDMA, FDMA, CDMA, OFDM)

- Introduction to Information Theory, probability theory and random processes
- Definitions and applications of Entropy, Information, Channel Capacity, etc.
- Introduction to various noise effects.
- Review of random variables and processes, and the Gaussian distribution.
- AWGN noise effects and maximum-likelihood receiver design.

8.3.10 Course materials

Textbook

[1] 1. B. P Lathi and Z. Ding. *Modern Digital and Analog Communication Systems*. 4th Edition, Oxford University Press, 2009

Reference books:

[2] Proakis and Salehi. *Fundamentals of Communication Systems*. Prentice Hall

[3] Haykin. *Communication Systems*. 4th Ed., Wiley

[4] Stern and Mahmoud. *Communication Systems*. Prentice Hall

[5] Proakis and Salehi. *Communication Systems Engineering*. 2nd Ed., Prentice Hall

[6] E. Louis and Jr. Frenzel. *Principles of Electronic Communication Systems*. 4th Edition, McGraw Hill

8.3.11 Grading policy

Process valuation: 60%

Homework:	15%
Midterm exams:	30%
Quiz:	15%

Final evaluation: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

8.4 EE0018 Microwave engineering

8.4.1 Course name

vi English: Microwave engineering

8.4.2 Course code: EE0018

8.4.3 Course duration: 3 credits

8.4.4 Prerequisites

GEE003 - Electromagnetic fields EE0008 - Signal analysis
GEE007 - Random signals and noise
EE0004 - Electronic devices and applications 2

8.4.5 Corequisites

None

8.4.6 Course description

The course provides basic knowledge of passive microwave components and the electromagnetic theory behind their operation. Weight is placed mainly on the electromagnetic aspects important for design of microwave components. The course is suited both for microwave design engineers and those who encounter passive microwave components as sub-components in a RF, Microwave or optical systems.

8.4.7 Course mission/goal/objectives

The aim of the course is to give the student basic knowledge in electromagnetic theory and basic understanding for microwave components.

8.4.8 Learning outcomes

Having completed this course, students will be able to:

- show basic knowledge in electromagnetic theory.
- show understanding for how transmission lines and wave guides are involved in microwave networks.
- analyze microwave networks.
- show understanding for microwave resonators.
- show understanding for power dividers.
- show understanding for microwave filters.

8.4.9 Course topics

The course includes:

- basic knowledge of passive microwave components and the electromagnetic theory behind their operation.
- the electromagnetic aspects important for design of microwave components.
- passive microwave components as sub-components in a RF, Microwave or optical systems.

8.4.10 Course materials

Textbook

[1] David Pozar. *Microwave engineering*. Wiley, 2005

Reference books:

8.4.11 Grading policy

Process valuation: 60%

Homework:	15%
Midterm exams:	30%
Quiz:	15%

Final evaluation: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

8.5 GMA006 Higher level language

8.5.1 Course name

English: Higher level language

8.5.2 Course code: GMA006

8.5.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

8.5.4 Prerequisites

None

8.5.5 Corequisites

None

8.5.6 Course description

C++ (pronounced cee plus plus) is a general purpose programming language. It has imperative, object-oriented and generic programming features, while also providing the facilities for low level memory manipulation.

8.5.7 Course mission/goal/objectives

The course fully covers the basics of programming in the “C++” programming language and presents the fundamental notions and techniques used in object-oriented programming. It starts with universal basics, not relaying on object concepts and gradually extends to advanced issues observed in the objective approach.

8.5.8 Learning outcomes

Knowledge:

- To familiarize the trainee with the universal concepts of computer programming.
- To present the syntax and semantics of the “C++” language as well as basic data types offered by the language.
- To discuss the principles of the object-oriented model and its implementation in the "C++" language.
- To demonstrate the means useful in resolving typical implementation problems with the help of standard "C++" language libraries.

Skills:

- Understand and use the basic programming constructs of C/C++.
- Manipulate various C/C++ datatypes, such as arrays, strings, and pointers

- Isolate and fix common errors in C++ programs.
- Use memory appropriately, including proper allocation/deallocation procedures.
- Apply object-oriented approaches to software problems in C++.
- Write small-scale C++ programs using the above skills.

8.5.9 Course topics

- Introduction to Programming, compiling and software development.
- Basic scalar data types, operators, flow control, streamed input/output, conversions
- Assignment and Interactive Input
- Selection statements
- Repetition statements
- Modularity Using Functions
- Arrays and Strings
- IO with files

8.5.10 Course materials

Textbook

[1] G. Bronson. *C++ for Engineers and Scientists 3rd edition*. Cengage, 2010

Reference books:

[2] Deitel. *C++: How to Program*. 6th edition, Prentice Hall

[3] Lippman and Lajoie. *C++ Primer*. 3rd edition, Addison Wesley

[4] Eckel. *Thinking in C++*. Vol. 1 & 2, Prentice Hall

[5] Stroustrup. *The C++ Programming Language*. Addison Wesley

[6] Ivor Horton. *Beginning C++: The Complete Language*. WROX

[7] Davidson. *C++ Program Design*. McGraw Hill

[8] D'Orazio. *Programming in C++: Lessons and Applications*. McGraw Hill

[9] Kernighan and Ritchie. *The C Programming Language*. Prentice Hall

8.5.11 Grading policy

Process valuation: 60%

Homework:	15%
Midterm exams:	30%
Quiz:	15%

Final evaluation: 40%

Type: Writing

Attendance policy: Any student who misses 1/5 or more of the course risks failure in the course.

8.6 EE0016 Senior design 2

8.6.1 Course name

2 English: Senior design 2

8.6.2 Course code: EE0016

8.6.3 Course duration: 3 credits

8.6.4 Prerequisites

EE0009 - Senior design 1

8.6.5 Corequisites

None

8.6.6 Course description

Senior 2 is the course that student project teams design, build, test and present results for realistic projects from university and industrial sponsors. Formulation of specifications, consideration of alternative solutions, feasibility considerations, detailed system descriptions, economic factors, safety, reliability, aesthetics, ethics and social impact.

8.6.7 Course mission/goal/objectives

This realistic projects is the next job of Senior Design I to be carried out in experiment.

8.6.8 Learning outcomes

- This is the capstone design course.
- Students will integrate skills listed in Outcome 2 to produce quantifiable results.
- Students will work in teams and communicate results.
- Students will be familiar with and be able to apply practical constraints.

8.6.9 Course topics

- Design of Sectional Aspects of a Large Project. Integrate the individual Aspects for an Overall Working System or Project. Teaming (multiple members, preparation for multidisciplinary teams). Scheduling (Gantt chart). Customer (or management) Interaction. Customer (or management) Satisfaction. Presentation (and demonstration) of Final Project. Apply theoretical (book) to practice.

8.6.10 Course materials

Textbook

No book.

Reference books:

No book.

8.6.11 Grading policy

Type	Defend
Duration	30 mins
Main topics	Presentation and defend.

Attendance policy: Follow current policy of the AP training.

8.7 EE0012 Power electronics

8.7.1 Course name

English: Power electronics

8.7.2 Course code: EE0012

8.7.3 Course duration: 3 credits

8.7.4 Prerequisites

GEE001 - Electrical sciences
EE0004 - Electronic devices and applications 2
EE0010 - System analysis

8.7.5 Corequisites

None

8.7.6 Course description

Power Electronics is the course learning about Power electronic devices, components and their characteristics; DC to AC conversion; fundamentals of inverters and wave-shaping devices; application aspects; control aspects; characteristics and state-of-the-art of advanced power inverter and power conditioning topologies.

8.7.7 Course mission/goal/objectives

The course is an introduction to switched-mode power converters. It provides a basic knowledge of circuitry for the control and conversion of electrical power with high efficiency.

8.7.8 Learning outcomes

- Having completed this course, students will be able to:
- Model power electronic systems in terms of fundamental circuit devices.
- Analyze operation of rectifiers, inverters, regulators, choppers, and switches.

8.7.9 Course topics

- Introduction to Power Electronics.
- History, device classification, converter types.
- Ten Cornerstones of Power Electronics.
- Power Semiconductor Diodes.
- Diode circuits, freewheeling, energy transfer.
- Uncontrolled single-phase rectifier.

- Uncontrolled polyphase rectifier.
- Thyristor and its characteristics.
- Single-phase controlled rectifiers.
- Polyphase controlled rectifiers.
- Power factor control.
- AC voltage regulators – 1 ph. and 3 phase.
- Choppers.
- Switching Mode Regulator.
- Introduction to Inverters.
- Ideal voltage-source inverters.
- Inverter output voltage control.

8.7.10 Course materials

Textbook

[1] Rashid. *Power Electronics*. 3rd edition, Prentice Hall

Reference books:

8.7.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

8.8 EE0014 Digital electronics circuit design

8.8.1 Course name

English: Digital electronics circuit design

8.8.2 Course code: EE0014

8.8.3 Course duration: 3 credits

8.8.4 Prerequisites

EE0006 - Digital logic design (logic)
EE0004 - Electronic devices and applications 2

8.8.5 Corequisites

None

8.8.6 Course description

Theory of digital and electronics circuits. Digital logic families TTL, IIL, ECL, NMOS, CMOS, GaAs. Large signal models for transistors. Implementation at RAM and ROM. Circuit design for LSI and VLSI.

8.8.7 Course mission/goal/objectives

This course provides an overview of the field of digital electronics ranging from basic combinatorial circuits through to general state machine based design. Digital design using discrete logic components and hardware description languages are covered.

8.8.8 Learning outcomes

- Be able to understand the underlying technology of CMOS digital logic
- Be able to construct schematics for CMOS combinational logic
- Understand the construction of Digit Logic in CMOS technology
- Be able to design, verify and construct digital designs in CMOS technology
- Be able to understand the trade-offs between circuits, algorithms, and technology for a given design.

8.8.9 Course topics

- Digital Logic Inverters
- The CMOS Inverter
- Implications of Technology Scaling: Issues in Deep-Submicron Design
- CMOS Logic-Gate Circuits.
- Pseudo-NMOS Logic Circuits

- Pass-Transistor Logic Circuits
- Dynamic MOS Logic Circuits
- Emitter-Coupled Logic (ECL)
- Bi-CMOS Digital Circuits.
- Latches and Flip-Flops
- Semiconductor Memories: Types and Architectures
- Random-Access Memory (RAM) Cells
- Sense Amplifiers and Address Decoders

8.8.10 Course materials

Textbook

[1] Sedra Smith. *Microelectronic circuits*. 6th Edition

[2] Weste. *CMOS VLSI design: Circuits and Systems Perspective*. 3rd edition, Pearson

8.8.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

8.9 MLV103 History of Vietnamese communist party

8.9.1 Course name

English: History of Vietnamese communist party

8.9.2 Course code: MLV103

8.9.3 Course duration: 2 credits

Lecture hours	Practice hours	Laboratory hours
30	0	0

8.9.4 Prerequisites

MLV005 - Scientific socialism

8.9.5 Corequisites

None

8.9.6 Course description

The course "History of Vietnamese communist party" equips students with an understanding of the subject, objectives, tasks, research methods, and study of the history of the Communist Party of Vietnam. It provides essential and core knowledge about the birth of the Party (1920-1930), the Party's leadership in the struggle for state power (1930-1945), its leadership in the two resistance wars against French colonialism and American imperialism, and the completion of national liberation and reunification (1945-1975), as well as its leadership in the country's transition to socialism and the implementation of renewal policies (1975-2018).

Through this course, students will acknowledge the successes and shortcomings, summarize the experiences of the Party's revolutionary leadership, and enhance their understanding and trust in the Party. They will also develop the ability to apply the knowledge gained into practical work, contributing to the construction and defense of the socialist Vietnam Fatherland.

8.9.7 Course mission/goal/objectives

Goals	Goal description	Standard output

G1	Regarding knowledge: Provide systematic and fundamental knowledge about the establishment of the Communist Party of Vietnam (1920-1930), the Party's leadership during the revolutionary struggle for state power (1930-1945), in the two resistance wars against French colonialism and American imperialism (1945-1975), in the construction and defense of the homeland during the period of nationwide transition to socialism and the implementation of renewal policies (1975-2018).	
G2	Regarding skills: Equip students with scientific methods of thinking, analysis, and evaluation of history; develop skills in selecting research materials and studying the course; enhance the ability to apply historical understanding to practical work, critique misconceptions, and the Party's history.	
G3	Regarding attitude: Enhance students' political courage, national pride, patriotism, and loyalty to the revolutionary goals and ideals. Through historical events and experiences of the Party's leadership, build an awareness of respecting objective truths, instill confidence in the Party's choices and the people's choices.	

8.9.8 Learning outcomes

Goals	Standard output	Goal description	Degree
G1	G1.1	Presenting the concept of the Communist Party of Vietnam	I
	G1.2	Identifying the subject, research methods, and significance of the course in the History of the Communist Party of Vietnam	T
	G1.3	Presenting the process of establishing the Party	T
	G1.4	Describing the process of struggling for state power under the leadership of the Party from 1930 to 1945	T

	G1.5	Presenting the Party's leadership process in two resistance wars, completing the national liberation and unification (1945-1975).	T
	G1.6	Presenting the Party's leadership process in the country's transition to socialism and safeguarding the homeland (1975-1986).	T,U
	G1.7	Presenting the Party's leadership process in the country's renewal (1986-present).	T,U
	G1.8	Presenting the Party's leadership process in the country's renewal (1986-present).	T
	G1.9	Explaining the major lessons learned about the Party's leadership.	T
G2	G2.1	Students are trained to develop critical thinking skills and the ability to argue about the subject, objectives, and research tasks of a science, specifically the course on the History of the Communist Party of Vietnam.	T
	G2.2	They grasp the methodological foundations and research methods in the field of studying the history of the Party, applying them to analyze the process of Party establishment and its leadership in the Vietnamese revolution from its inception to the present.	T
	G2.3	Students demonstrate the ability to apply the knowledge gained from the course to analyze practical issues in politics, economics, society, national defense, and security in the current nation-building and defense efforts.	T
	G2.4	They acquire skills in identifying issues related to "peaceful evolution" and "violent overthrow" and correctly implementing the Party's guidelines and state legal policies.	T
G3	G3.1	Students maintain a positive attitude towards studying political theory subjects, having confidence in the goals, ideals, and success of the renewal process initiated and led by the Communist Party of Vietnam.	T

	G3.2	Students contribute to building and reinforcing confidence in the Party's leadership over the Vietnamese revolution in the process of constructing and defending the socialist homeland.	U
	G3.3	They identify their responsibility to contribute to propagating and implementing the Party's guidelines and policies, as well as the laws of the State, correctly.	U

8.9.9 Course topics

	Contents	Standard output
1	Content 1: The concept of the Communist Party of Vietnam.	G1.1, G2.1, G3.1
2	Content 2: Target, research methods, and significance of studying the History of the Communist Party of Vietnam.	G1.2, G2.1, G2.2, G3.1
3	Content 3: The establishment of the Communist Party of Vietnam and the struggle for power (1930 - 1945).	G1.3, G1.4, G2.1 G2.2, G3.2
4	Content 4: The Party's leadership in two resistance wars, completing the national liberation and reunification (1945 - 1975).	G1.5, G2.2, G2.3, G3.2
5	Content 5: Presenting the process of the Party's leadership in the country's transition to socialism and defending the homeland (1975 - 1986).	G1.6, G2.3, G3.2
6	Content 6: Presenting the process of the Party's leadership in the country's renovation (1986 - present).	G1.7, G2.3, G2.4, G3.2, G3.3
7	Content 7: Presenting the great victories of the Vietnamese revolution under the Party's leadership.	G1.8, G2.3, G2.4
8	Content 8: Presenting the major lessons about the Party's leadership.	G1.9, G2.3, G2.4, G3.3

8.9.1 Course materials

Textbook

[1] Bộ Giáo dục và Đào tạo. *Giáo trình Lịch sử Đảng Cộng sản Việt Nam*. NXB

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Reference books:

[2] Văn kiện. *Đại hội Đảng thời kỳ đổi mới*. NXB Chính trị quốc gia, Hà Nội, 2005

[3] Văn kiện. *Đại hội Đại biểu toàn quốc Đảng Cộng sản Việt Nam lần thứ XI*. NXB Chính trị quốc gia, Hà Nội 2011

[4] Văn kiện. *Đại hội Đại biểu toàn quốc Đảng Cộng sản Việt Nam lần thứ XI*. NXB Chính trị quốc gia, Hà Nội, 2016

[5] . *Văn kiện Đảng toàn tập*. NXB Chính trị quốc gia, Hà Nội, 2005

8.9.10

8.9.11 Grading policy

Form	Contents	Time	Tool	Standard output	Rate %
Written (1 period)	The Communist Party of Vietnam's Establishment and Struggle for Power (1930 - 1945)	Week 5	Progress test	G1.3, G1.4	13,3%
Written (1 period)	The Party's Leadership in Two Resistance Wars, Completing National Liberation and Reunification (1945 - 1975) Presenting the Process of the Party's Leadership in the Country's Transition to Socialism and Defending the Homeland (1975 - 1986)	Week 10	Progress test	G1.5, G1.6	13,4%
Home work assessment	Presenting the Process of the Party's Leadership in the Country's Renovation (1986 - Present) Presenting the Great Victories of the Vietnamese Revolution under the Party's Leadership Presenting the Major Lessons About the Party's Leadership	Week 15	Submitted homework	G1.7, G1.8, G1.9	13,3%
Question	The Entire Content of the Scientific Socialism Course	Final term	Final exam		60%

and ans wer					

- Students' responsibilities:
  - Attendance: minimum 80% of class sessions.
  - Assignments: must complete 100% of homework assigned by the instructor.
- Academic integrity:
  - Copying assignments or using internet translations detected as plagiarism will result in a deduction of 100% of the grade. In severe cases (multiple instances of copying - 3 or more similarities), the student may be barred from taking the final exam and may face further disciplinary action for facilitating plagiarism.
  - Students who fail to fulfill their responsibilities (as listed above) will be barred from taking exams and may face disciplinary action.
  - Students caught cheating during exams (either giving or receiving assistance) will be suspended or expelled.
- Grading scale: 10

8.10 GMA004 Introduction to MAE Practice

8.10.1 Course name

hành English: Introduction to MAE Practice

8.10.2 Course code: GMA004

8.10.3 Course duration: credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

8.10.4 Prerequisites

None

8.10.5 Corequisites

None

8.10.6 Course description

This course is an overview of engineering in industry that introduces engineering design concepts, basics of manufacturing processes, elementary modeling of engineering systems, and technical communications.

8.10.7 Course mission/goal/objectives

This course play a role as providing basic knowledge and skills required for successful engineering practice in numerous engineering aspects such as elementary modeling of engineering systems, oral and written communication, manufacturing basics, estimation and approximation, and engineering analysis and design.

8.10.8 Learning outcomes

Knowledge:

- Understand the role of mechanical and aerospace engineers in industry and society
- Be able to create rudimentary models for engineering systems
- Be able to effectively estimate and evaluate analytical results

Skills:

- Be able to construct engineering models and analyze engineering systems
- Be able to make and justify decisions
- Be able to make effectively estimations
- Develop communication and other skills relevant to practicing engineers

8.10.9 Course topics

This course explores the practice of mechanical and aerospace engineering and be introduced to engineering and technical skills characteristic of successful engineers. Throughout the course students will have opportunities to demonstrate their mastery of skills including constructing engineering models, making effective estimations, understanding results, making decisions and communicating effectively.

- Dimensions, Units and Measurements
- Introduction to Manufacturing processes
- Introduction to machine design and product design
- Tolerances and Fits
- Introduction to Screws and joining devices
- Manufacturing Planning
- Computer Aided Manufacturing & CNC Machine
- Workshop Safety

8.10.10 Course materials

Textbook

[1] Kemper Lewis. *Mechanical and Aerospace Engineering Practice.* University at Buffalo, 2007

Reference books:

[2] Alexander Kossiakoff, William N. Sweet, Sam Seymour, Steven M. Biemer. *Systems Engineering Principles and Practice*. 2011

[3] Jay Brockman. *Introduction to Engineering: Modeling and Problem Solving*. 2008

8.10.11 Grading policy

Attendance:	10%
Assignments + tests:	20%
Midterm exams:	20%
Final exam:	50%

SEMESTER 9

No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
9th Semester (16 weeks + 3 weeks for exams)					
1	GEE002	Engineering economy	3	3	FIT
2	GEE009	Data communications	3	3	FIT
3A	EE0011	Engineering optics. *Elective*	3	3	FIT
3B	MAE014	Instrumentation and computer . *Elective*			
4A	GEE010	Introduction to Biomedical engineering modeling and systems. *Elective*	3	3	FIT
4B	EE0020	Control systems. *Elective*			
5	GMA005	The evolution of the earth and Solar system	3	3	FIT
6	EE0002	Microcomputer principles and applications	3	3	FIT
7	MLV004	Ho Chi Minh's ideology. *For Vietnamese students only*	2	2	FIT
Total			20 (18)	20 (18)	

9.1 GEE002 Engineering economy

9.1.1 Course name

English: Engineering economy

9.1.2 Course code: GEE002

9.1.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

9.1.4 Prerequisites

ENG106 - English for engineering

9.1.5 Corequisites

None

9.1.6 Course description

Engineering Economy is an introductory course that introduces the basic models of microeconomic theory, and mathematical reasoning that is widely used in theoretical and applied microeconomics. Consumer decision theory, demand curves for goods, producer decision theory, production process and associated cost function, cost-minimizing and profit-maximizing behavior of firms, and introductory-level deregulated electricity market will be covered.

9.1.7 Course mission/goal/objectives

The primary objective of the course is to build an understanding of the world in which we live. The questions of how people make decision, how they interact and how the economy as a whole works are the main concerns of the course. The course also aims to make students more astute participant in the economy. The concepts and theory provided in the course give you a new perspective of how best to make decision in many life's situations.

Finally, the course provides you with ability to evaluate both potential and limits of economic policies: Price ceiling, price floor, taxes, and import and export.

9.1.8 Learning outcomes

- Having completed this course, students will be able to:
- Use ideas of economics to explain general phenomena in an economy.
- Use the theory of comparative advantage to explain how people make decision.
- Derive the supply curve, demand curve and the equilibrium price and quantity of a competitive market.
- Calculate the price elasticity of demand using mid-point method.

- Use the tools of supply and demand to examine the effects of various government policies.
- Calculate the consumer's surplus, producer's surplus, total surplus and the cost of taxation.
- Derive the profit-maximization of a firm in competitive markets from the costs of production.
- Derive the cost-based operations of regulated power systems.
- Derive the price-based operation of deregulated power systems.

9.1.9 Course topics

- The principles of economics: How people make decision? How people interact? How the economy as a whole works?
- Market forces of supply and demand: Competitive markets and the market equilitium.
- Elasticity of demand, elasticity of supply and their determinants.
- Goverment policies: Controls on price, taxes.
- Consumer surplus, producer surplus and the efficiency of markets.
- The cost of taxation: Tax revenue and deadweight loss and its determinants.
- The cost of production: Fixed cost, variable cost, costs in the short run and long run.
- Firms in competitive markets: Cost minimization versus profit maximization.
- Regulated electric power systems: Cost-based operations, economic dispatch.
- Deregulated electricity markets: Price-based operations, optimal bidding in electricity markets.

9.1.10 Course materials

Textbook

[1] Gregory N. Mankiw. *Essentials of Economics*. 5th Edition, South-Western Cengate Learning, 2008

Reference books:

[2] Roberth H. Frank, Ben S. Bernanke. *Principles of Economics*. 2nd Edition, Mc Graw Hill, 2003

[3] Arthur R. Begen and Vijay Vittal. *Power Systems Analysis*. Prentice Hall, 2000

[4] Mohammad Shahidepour, Hatim Yamin, Zuyi Li. *Market Operations in Electric Power Systems*. John Wiley and Sons, 2002

9.1.11 Grading policy

Homework:	15%
Midterm exam:	20%
Quiz:	15%
Final exam:	50%

9.2 GEE009 Data communications

9.2.1 Course name

English: Data communications

9.2.2 Course code: GEE009

9.2.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

9.2.4 Prerequisites

EE0013 - Communication electronics (thong)

Students must have a working knowledge of fundamental data structures and associated algorithms. For some of the practical aspects of the course, a working knowledge of an object-oriented programming language (e.g., C++, C#, or preferably Java) is expected.

9.2.5 Corequisites

None

9.2.6 Course description

This course teaches the design and implementation techniques essential for engineering robust networks. Topics include networking principles, Transmission Control Protocol/Internet Protocol, naming and addressing (Domain Name System), data encoding/decoding techniques, link layer protocols, routing protocols, transport layer services, congestion control, quality of service, network services, Software Defined Networks (SDNs), programmable routers and overlay networks, wireless and mobile networking, security in computer networks, multimedia networking, and network management.

9.2.7 Course mission/goal/objectives

- To introduce the basics of data communications and computer networks.
- To examine and understand network protocols and architectures.
- To educate the student in modern networking technologies

9.2.8 Learning outcomes

- Understand the rudiments of how computers communicate.
- Be familiar with the architecture of a number of different networks.
- Understand the principles of protocol layering.
- Be familiar with modern telecommunications

9.2.9 Course topics

- Data communications: Transmission media, data encoding, transmission modes, error detection and correction, flow control, multiplexing, switching techniques, routing.
- Networking: Network topologies, protocols, layering, standardisation, LANs, WANs and MANs, internetworking, management, multicast, continuous media.
- Study of particular networks and protocols: e.g. FDDI, Ethernet, ISDN, SNMP, TCP/IP, X25, ATM.

9.2.10 Course materials

Textbook

[1] Nader F. Mir. *Computer and Communication networks*. Second Edition, Prentice Hall

9.2.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

9.3 EE0011 Engineering optics

9.3.1 Course name

English: Engineering optics

9.3.2 Course code: EE0011

9.3.3 Course duration: 3 credits

9.3.4 Prerequisites

GEE003 - Electromagnetic fields
EE0004 - Electronic devices and applications 2

9.3.5 Corequisites

None

9.3.6 Course description

'Optics engineering' is the field of study that focuses on applications of optics. Optics is the branch of physics which involves the behaviour and properties of light, including its interactions with matter and the construction of instruments that use or detect it. Optical engineers design components of optical instruments such as lenses, microscopes, telescopes, and other equipment that utilizes the properties of light. Other devices include optical sensors and measurement systems, lasers, fiber optic communication systems, optical disc systems

9.3.7 Course mission/goal/objectives

Upon completion of this course, the student should be able to explain, design and build devices that make light do something useful, they must understand and apply the science of optics in substantial detail, in order to know what is physically possible to achieve (physics and chemistry). However, they also must know what is practical in terms of available technology, materials, costs, design methods, etc. As with other fields of engineering, computers are important to many (perhaps most) optical engineers

9.3.8 Learning outcomes

Knowledge:

After learning this course, students are able to:

- Understand electromagnetic spectrum;
- Develop optics devices
- Demonstrate how to design, write, test, and revise textual and visual communication;
- Demonstrate how to integrate written content, graphics, and basic design principles in order to create usable, reader-friendly documents;

Skills:

After learning this course, students are able to:

- Analyze communication contexts rhetorically by understanding audiences, purposes, and situations;
- Capacity to learn in further study.

9.3.9 Course topics

- OPTICAL FIBER
- SEMICONDUCTOR LASER
- PHOTODETECTOR
- OPTICAL COMMUNICATION NETWORKING

9.3.10 Course materials

Textbook

[1] Mohammad Azadeh. *Fiber Optics Engineering*. Springer

[2] Harry J. R. Dutton. *Understanding optical communications*. IBM Corporation

Reference books:

9.3.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

9.4 MAE014 Instrumentation and computer

9.4.1 Course name

English: Instrumentation and computer

9.4.2 Course code: MAE014

9.4.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
39	0	6

Two lectures and one three-hour laboratory weekly

9.4.4 Prerequisites

EE0006 - Digital logic design (logic)

9.4.5 Corequisites

None

9.4.6 Course description

Introduces data acquisition using A/D converters. Theory of A/D and D/A converters, fundamentals and examples of transducers used for mechanical measurements, static and dynamic response, amplifiers, theory of A/D and D/A converters, error analysis, elementary statistics.

9.4.7 Course mission/goal/objectives

The primary objective of this course is to introduce modern methods of acquiring and processing experimental data using a personal computer system. Understanding the capabilities and limitations of computerized data acquisition and processing is essential to designing experimental practices capable of achieving meaningful objectives.

The ability of computers to produce overwhelming quantities of information places demands on the experimentalist to carefully design the experiment to acquire meaningful quality data not massive quantities of data.

The laboratory sessions are designed to reinforce the concepts presented in the lectures and to give you hands-on experience in using modern instrumentation. A secondary objective of the course is to teach good laboratory practice and work habits.

Written laboratory reports are required following the format described in the laboratory section of this web page.

9.4.8 Learning outcomes

9.4.9 Course topics

- Static and Dynamic Characteristics of Signals.
- Sampling, Digital Devices, and Data Acquisition.

- Measurement System Behavior.
- Temperature Measurements.
- Probability and Statistics.
- Pressure and Position measurements
- Uncertainty analysis
- Analog Electrical Devices and Measurements.

9.4.10 Course materials

Textbook

[1] R.S. Figliola and D.E. Beasley. *Theory and Design for Mechanical Measurements*. John Wiley and Sons, NY, Third Edition, 2000

Reference books:

[2] Jacob Fraden. *Handbook of modern sensors*. 2OO4, ISBN: 0-387-00750-4

9.4.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

9.5 GEE010 Introduction to Biomedical engineering modeling and systems

9.5.1 Course name

English: Introduction to Biomedical engineering modeling and systems

9.5.2 Course code: GEE010

9.5.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

9.5.4 Prerequisites

EE0017 - Introduction to Digital Signal Processing

9.5.5 Corequisites

None

9.5.6 Course description

An introduction to the modeling approaches implemented in understanding several basic physiological phenomena. Topicsinclude action potential and bio-electrical modeling, saccadic movement and bio-mechanical modeling, compartmental modeling, and bio-signal processing techniques.

9.5.7 Course mission/goal/objectives

The course will introduce historical development and survey of major areas comprising biomedical engineering: theoretical neurobiology and systems physiology, biomedical instrumentation, artificial organ and prosthetic devices, biomedical computer applications.

9.5.8 Learning outcomes

After learning this course, students will:

- Be able to represent the mechanism of membrane potential using circuit elements.
- Be able to analyze the membrane circuit model using Laplace Transform.
- Be able to derive the resting membrane potential using Goldman equation.
- Be able to analyze the action potential using circuit model and SIMULINK.
- Be able to sketch free-body diagram of mechanical systems.
- Be able to describe the mechanical systems using state equation.
- Be able to perform linearization of a non-linear state equation given a working point.

- Be able to identify the time-constant of 1st and 2nd order systems.
- Be able to analyze material transfer in compartments using Laplace Transform.
- Be able to process bio-signals using Fourier Transform.

9.5.9 Course topics

- Relevant physiology: cell structure, eye anatomy, glucose regulation mechanism.
- Bioelectrical phenomena: Nernst equation, Goldman equation and Ion pump.
- Action potential: Hodgkin-Huxley model.
- Translational and rotational mechanical system.
- Linearization of non-linear equation.
- Identification of 1st and 2nd order systems.
- Biomechanical modeling: eye saccadic movement.
- Compartmental analysis and infectious disease model.

9.5.10 Course materials

Textbook

[1] John Enderle, Susan Lanchard and Joseph Bronzino. *Introduction to Biomedical Engineering*. 2nd Edition, Academic Press, 2005, ISBN–0122386620

Reference books:

[2] Robert Plonsey and Roger C. Barr. *Bioelectricity: a quantitative approach*. New York, NY, Springer, 2007

9.5.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

9.6 EE0020 Control systems

9.6.1 Course name

English: Control systems

9.6.2 Course code: EE0020

9.6.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

9.6.4 Prerequisites

EE0010 - Systems analysis

9.6.5 Corequisites

None

9.6.6 Course description

Control system optimization and compensation techniques, digital control theory, computer simulation studies.

9.6.7 Course mission/goal/objectives

This course focuses on design in the laboratory and in the homework. The problems are relatively unspecified and the student is challenged to complete the problem specifications, propose a design strategy and complete the iterative steps required to select the “best” set of parameters. The student is required to continually use computer-aided design software and for two systems to actually verify the results of the designing using a constructed system with actual components.

9.6.8 Learning outcomes

- Find a mathematical model called a state space representation for a linear, time-invariant system.
- Convert transfer function and state space models.
- Linearize a state-space representation.
- Find the time response from the state-space representation.
- Represent, in state space, a system consisting of multiple subsystems.
- Convert between alternative representations of a system in state space.
- Determine stability of a system represented in state space.
- Find the steady-state error for systems represented in state space.
- Design a state-feedback controller using pole placement to meet transient response specifications.

- Design an observer for systems where the states are not available to the controller.
- Understand optimal control of dynamic systems.
- Model Digital Control Systems.

9.6.9 Course topics

- Introduction to Control Systems
  - Dynamic systems in state space
  - Controllability and Observability
  - Observers for state control
- Linear Control systems
  - Relation between eigenvalues and poles
  - Pole placement idea
  - Pole placement in s-domain (root locus rules and application)
  - Introduction to state control
- Optimal control of dynamic systems
  - Optimal control problem (OCP)
  - Linear quadratic controller design (LQC)
- Digital Control
  - Difference equations
  - The z-transform
  - Modeling Digital Control Systems
  - Stability of Digital Control Systems

9.6.10 Course materials

Textbook

[1] M. Sami Fadali and A. Visioli. *Digital Control Engineering*. Academic Press, Burlington, MA, 2013

[2] Katsuhiko Ogata. *System Dynamics*. Pearson, Prentice Hall, New Jersey, 2004

[3] Richard C. Dorf and Robert H. Bishop. *Modern Control Systems*. 12th edition Prentice Hall, 2010

Reference books:

[4] Luenberger. *Introduction to dynamic systems*. Wiley, 1979

[5] Goodwin, Graebe, Salgado. *Control system design*. Prentice Hall, 2001

9.6.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

9.7 GMA005 The evolution of the earth and Solar system

9.7.1 Course name

English: The evolution of the earth and Solar system

9.7.2 Course code: GMA005

9.7.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

9.7.4 Prerequisites

None

9.7.5 Corequisites

None

9.7.6 Course description

Evolution of the Earth and Solar System is scientific course studying origin, formation and evolution of the Earth and Solar system.

9.7.7 Course mission/goal/objectives

Evolution of the Earth and Solar System course is a science course providing a firm basis for understanding the fundamentals of phenomena in nature. Upon completion, students should be able to demonstrate an understanding of the Earth and Solar system to explain some of the most Earth's natural phenomena. In addition to, this course will make significant contribution to nurture an appreciation and respect for our natural environment. This course fulfills the graduation requirements.

9.7.8 Learning outcomes

Knowledge:

- Overview of Earth's major physical phenomena, including mountain-building, volcanoes, plate tectonics and hydrologic processes.
- Emphasizes the interaction of Earth's processes and features as a global system and how these compare to those on other planets in the Solar System.
- Examines the history of geology, the character of organic evolution, and the interaction of geological and biological processes that produce the history of the Earth.

Abilities:

- Understand the origin, formation and evolution of the Earth and Solar System.

- Explain scientifically natural phenomena and geologic processes occurring on the Earth.

9.7.9 Course topics

- The Planet Earth
- The Geosphere: Earth Beneath Our Feet
- The Atmosphere: Earth's Gaseous Envelope
- The Hydrosphere: Earth's Blanket of Water and Ice
- The Biosphere: Life on Earth
- The Anthrosphere: Humans and the Future of Earth

9.7.10 Course materials

Textbook

[1] Brian J. Skinner, Barbara W. Murck. *The Blue Planet: An Introduction to Earth System Science*. John Wiley & Sons, 3rd Edition

Reference books:

[2] S. Chernicoff, A. Haydn and H. Lawrence. *Earth: Geologic Principles and History*. Newyork, Houghton Company, 2002

[3] R. Dott, and R. Batten. *Evolution of the Earth*. USA, McGraw Hill Companies, 1981

[4] W. Emmons, G. Thiel, C. Stauffer and I. Alison. *Geology principles and processes*. 2nd ed. Newyork, McGraw Hill Company, 1939

9.7.11 Grading policy

Evaluation process: 60%

Content	Form of Assessment			
	Quiz	Homework	Essay	Prac/Lab
The Planet Earth	5%	5%	5%	
The Geosphere: Earth Beneath Our Feet	5%			
The Atmosphere: Earth's Gaseous Envelope	5%			
The Hydrosphere: Earth's Blanket of Water and Ice	5%	5%	5%	
The Biosphere: Life on Earth	5%	5%	5%	
The Anthrosphere: Humans and the Future of Earth	5%			

Final evaluation(40%)

Form	Paper or Oral examination
Time	90 mins for paper exam or 30 mins preparing for oral exam
Content	- Planet Earth - The Atmosphere: Earth's Gaseous Envelope - The Geosphere: Earth Beneath Our Feet - The Biosphere: Life on Earth - The Anthrosphere: Humans and the Future of Earth

9.8 EE0002 Microcomputer principles and applications

9.8.1 Course name

vi English: Microcomputer principles and applications

9.8.2 Course code: EE0002

9.8.3 Course duration: 3 credits

Lecture hours	Practice hours	Laboratory hours
45	0	0

9.8.4 Prerequisites

EE0006 - Digital logic design (logic)
EE0004 - Electronic devices and applications 2

9.8.5 Corequisites

None

9.8.6 Course description

Introductory microcomputers. Digital logic elements and number systems, memory components and organization. Microprocessor and microcomputer system architecture, assembly language programming, software development, interfacing techniques.

9.8.7 Course mission/goal/objectives

In this course students shall be introduced to program and configure the microcomputer hardware based on TI's microcontroller platforms. Obtaining knowledge in this subject will provide students' abilities to implement practical applications in their future works in company with other subjects.

9.8.8 Learning outcomes

- Draw a block diagram of the main parts of a CPU and describe each part.
- Define basic terminology related to computing (e.g. Program Counter, Stack, Algorithm).
- Demonstrate understanding of the CPU's interpretation of instructions and data by showing how numbers and program statements are stored and operated on by the CPU.
- Generate original assembly code using the software development cycle (analyze problem, create algorithm, draw flowchart, write program, and debug program).
- Utilize the advanced features of the CPU (stacks, interrupts, advanced instructions) to accomplish complex tasks.

- Identify problems in familiar and unfamiliar programs, and correct and improve the code.
- Interface with different types of I/O devices with a range of interface protocols (serial, parallel, digital, analog).
- Design and compare different solutions to a problem and evaluate which one is better.
- Transfer knowledge from the simulation environment to a microprocessor development board.
- Work with other students to develop teamwork skills and an appreciation for alternate approaches to a problem.

9.8.9 Course topics

- What goes on in the CPU during the execution of an instruction?
- How does an embedded system differ from a general purpose computer?
- How are numbers represented in a CPU and what are the basic operations that are performed on numbers in a CPU?
- What are the steps to creating a working program?
- What are the different parts of an assembly program and why are they important?
- What are the different addressing modes, how do they differ from one another and why do we need more than one addressing mode?
- How do we communicate with the devices that are connected to the CPU?
- What are some of the important things to consider when communicating with other devices or with data from the point of view of time and space required for storage?
- Why do we need subroutines and how is the stack used with subroutines?
- Why would we use interrupts and how do we implement them into the program?

9.8.10 Course materials

Textbook

[1] Valvano. *Embedded Microcomputer Systems Real Time Interfacing*. Brooks/Cole

9.8.11 Grading policy

Process evaluation: 60%

Homeworks:	15%
Midterm exams:	30%
Quiz:	15%

Final exam: 40%

Type: Writing

Attendance policy: Follow current policy of the AP training.

9.9 MLV004 Ho Chi Minh's ideology

9.9.1 Course name

English: Ho Chi Minh's ideology

9.9.2 Course code: MLV004

9.9.3 Course duration: 2 credits

Lecture hours	Practice hours	Laboratory hours
30	0	0

9.9.4 Prerequisites

MLV103 - History of Vietnamese communist party

9.9.5 Corequisites

None

9.9.6 Course description

Ho Chi Minh's ideology is a political science course that encompasses Ho Chi Minh's system of views on fundamental issues of the Vietnamese revolution. The course content includes 6 chapters: Chapter 1 introduces basic introductory topics related to Ho Chi Minh's ideology; Chapter 2 discusses the foundation, formation process, and development of Ho Chi Minh's ideology; Chapters 3 to 6 present the fundamental contents of Ho Chi Minh's ideology and the Party's application regarding: national independence and socialism; the Communist Party of Vietnam and the state of the people, by the people, for the people; national unity and international solidarity; culture, ethics, and human beings. This course is compulsory in the training program for undergraduate and college students majoring in non-specialized Marxism-Leninism, Ho Chi Minh's ideology. Prerequisite courses include: Marxist-Leninist Philosophy, Marxist-Leninist Political Economy, Scientific Socialism, History of the Communist Party of Vietnam.

9.9.7 Course mission/goal/objectives

(Goals)	Goal description	Standard output

G1	Students grasp the basic knowledge of the concept, subject, research methods, and significance of studying Ho Chi Minh's ideology; the foundation, formation process, and development of Ho Chi Minh's ideology; the value of Ho Chi Minh's ideology; the basic contents of Ho Chi Minh's ideology and its application by the Party in the current period.	Regarding knowledge
G1	They contribute to shaping students' abilities in independent thinking, analysis, evaluation; applying Ho Chi Minh's ideology to perceive and evaluate historical, political, and social issues.	Regarding skills
G1	Students elevate their political courage, patriotism, and loyalty to the goal of national independence intertwined with socialism; recognize the role and value of Ho Chi Minh's ideology for the Party and the Vietnamese people; understand their own responsibilities in studying, cultivating ethics to contribute to building and defending the homeland; have consciousness and responsibility in self-cultivation, moral character development.	Regarding attitude

9.9.8 Learning outcomes

Goals	Standard output	Goal description	Degree
G1	G1.1	- Master the concept of Ho Chi Minh's ideology. Articulate the subject, research methods, and significance of studying Ho Chi Minh's ideology.	I
	G1.2	- Acquire knowledge about the foundation and formation process of Ho Chi Minh's ideology; understand the value of Ho Chi Minh's ideology to the Vietnamese revolution and the progressive development of humanity.	T
	G1.3	- Grasp the basic contents of Ho Chi Minh's ideology regarding national independence and socialism.	T

	G1.4	- Grasp the fundamental contents of Ho Chi Minh's ideology regarding the Communist Party of Vietnam and the state of the people, by the people, for the people.	T
	G1.5	- Understand the basic contents of Ho Chi Minh's ideology regarding national unity of all ethnic groups and international solidarity.	T
	G1.6	- Comprehend the fundamental contents of Ho Chi Minh's ideology regarding culture, ethics, and human beings.	T
G2	G2.1	- Possess independent thinking; analyze and evaluate objective issues dialectically.	T
	G2.2	- Apply Ho Chi Minh's ideology to perceive and evaluate historical and current socio-political issues.	U
G3	G3.1	- Demonstrate political courage, patriotism, and loyalty to the goal of national independence intertwined with socialism.	T
	G3.2	- Recognize the role and value of Ho Chi Minh's ideology for the Communist Party and the Vietnamese people.	T
	G3.3	- Take personal responsibility in studying and cultivating ethics to contribute to the construction and defense of the homeland; have consciousness and responsibility in self-cultivation and moral character development.	U

9.9.9 Course topics

No	Contents	Standard output
1	Content 1: Definition, subjects, research methods, and significance of studying Ho Chi Minh Thought.	G1.1; G3.2
2	Content 2: Foundation, formation process, and development of Ho Chi Minh's ideology.	G1.2; G3.2
3	Content 3: Ho Chi Minh's thoughts on national independence and socialism.	G1.3;G2.1; G2.2;G3.1; G3.3

4	Content 4: Ho Chi Minh's thoughts on the Communist Party of Vietnam and the state of the people, by the people, for the people.	G1.4; G2.1, G2.2;G3.1; G3.3
5	Content 5: Ho Chi Minh's thoughts on national unity of all ethnic groups and international solidarity.	G1.5;G2.1; G2.2; G3.1; G3.3
6	Content 6: Ho Chi Minh's thoughts on culture, ethics, and human beings.	G1.6;G2.1; G2.2; G3.1; G3.3

9.9.1 Course materials

Textbook

[1] Bộ Giáo dục và Đào tạo. *Giáo trình Tư tưởng Hồ Chí Minh*. NXB Chính trị Quốc gia - Hà Nội, 2019

Reference books:

[2] . *Hồ Chí Minh toàn tập*. NXB Chính trị quốc gia - Hà Nội, 2011

[3] . *Hồ Chí Minh biên niên tiểu sử*. NXB Chính trị quốc gia - Hà Nội, 2008

[4] Song Thành. *Hồ Chí Minh - Nhà tư tưởng lỗi lạc*. NXB Lý luận chính trị - Hà Nội, 2005

[5] Đảng Cộng sản Việt Nam. *Văn kiện Đảng toàn tập*. NXB Chính trị quốc gia - Hà Nội, 2002

9.9.10

9.9.11 Grading policy

Form	Contents	Time	Tool	Standard output	Rate %
Kiểm tra viết (1 tiết)	The concept, foundation, and formation process of Ho Chi Minh's ideology.	Week 5	Progress test	G1.1, G1.2, G3.2	13,3%

Kiểm tra viết (1 tiết)	Ho Chi Minh's thoughts on national independence, socialism. Ho Chi Minh's thoughts on the Communist Party of Vietnam and the state of the people, by the people, for the people.	Week 10	Progress test	G1.3, G1.4, G2.1, G2.2, G3.1, G3.3	13,4%
Kiểm tra bải nhà	The thoughts of Ho Chi Minh on the national unity of all ethnic groups and international solidarity. The thoughts of Ho Chi Minh on culture, ethics, and human beings.	Week 15	Submitted homework	G1.5, G1.6, G2.2, G3.1, G3.2, G3.3	13,3%
Vấn đáp	The entire content of the Ho Chi Minh Thought course.	Final term	Final exam		60%

- Students' responsibilities:
  - Attendance: minimum 80% of class sessions.
  - Assignments: must complete 100% of homework assigned by the instructor.
- Academic integrity:
  - Copying assignments or using internet translations detected as plagiarism will result in a deduction of 100% of the grade. In severe cases (multiple instances of copying - 3 or more similarities), the student may be barred from taking the final exam and may face further disciplinary action for facilitating plagiarism.
  - Students who fail to fulfill their responsibilities (as listed above) will be barred from taking exams and may face disciplinary action.
  - Students caught cheating during exams (either giving or receiving assistance) will be suspended or expelled.
- Grading scale: 10

SEMESTER 10

No.	Code	Subject	Acc credits	Credits	Ghi chú Notes
10th Semester					
1	TTV003	Internship in industry	6	6 (8 weeks)	FIT
2	EE0019	Final design project	6	6	FIT
Total			12	12	

10.1 TTV003 Internship in industry

10.1.1 Course name

English: Internship in industry

10.1.2 Course code: TTV003

10.1.3 Course duration: 6 credits (8 weeks)

Week	Content	Act.
1	Student introduction to the industry sites (Guided by instructors)	
2,3	Students conduct their job at the industry sites	
4	The instructors go on an inspection tour about student's work at the industry sites	
5, 6, 7	Student conduct their job at the industry sites	
8	Student finish their work and write their final reports The instructors grade the final reports	

10.1.4 Prerequisites

Students who have obtained 140 credits are eligible for "Internship in Industry" course.

10.1.5 Corequisites

None

10.1.6 Course description

The course is practical working of solving engineering problems in the real industry.

As an integral part of engineering education, the course "Internship in industry" provides students with an opportunity to gain work experience that will enhance and complement their academic learning; Enables correlation of class room learning with its application in industry; Broadens understanding of the types of employment available in the field; Helps students discover their individual interests; Builds resume credentials for the students; and develops relationships between TNUT and industrial firms.

10.1.7 Course mission/goal/objectives

Provides experience in real-world engineering problems for senior students.

10.1.8 Learning outcomes

As a result of the internship, the student will:

- Develop practical engineering skills and judgment
- Communicate effectively

- Discover their own interests within the field of Electrical Engineering
- Build resume credentials to help them compete for full time positions upon graduation.

10.1.9 Course topics

- Assigns projects from local industry.

10.1.10 Course materials

Textbook

No required textbooks.

Reference books:

No required reference books.

10.1.11 Grading policy

Employer Performance Appraisal:	50%
Final Report:	50%

Final Report:

Final report for Internship Course should cover the following information:

- *Job description*. Describe in detail your internship position duties and responsibilities. Discuss what duties were performed on a daily basis, periodic (e.g., weekly) basis, and one-time special projects.
- *Knowledge gained*. Describe the knowledge gained or enhanced as a result of your internship experience. Relate this knowledge to what you learned in specific courses at TNUT. Did your courses prepare you to handle the responsibilities of your position?
- *Skills learned*. Describe the skills that you learned or sharpened on the job. Discuss any skills that you learned as part of a course at TNUT that were useful on the job.
- *Attitudes/values*. Describe the attitudes or values that you fount to be important for success in your job.
- *Learning outcomes*. Identify the outcomes or results from the knowledge, skills and attitudes or values that you have described above. For example, what can you do for an organization today that you could not have done, or could not have done as well, before your internship.

Attendance policy: Follow current policy of the AP training.

10.2 EE0019 Final design project

10.2.1 Course name

English: Final design project

10.2.2 Course code: EE0019

10.2.3 Course duration: 6 credits

Lecture hours	Practice hours	Laboratory hours
90	0	0

10.2.4 Prerequisites

All courses in syllabus.

10.2.5 Corequisites

None

10.2.6 Course description

Final design project is the course that student project teams design, build, test and present results for realistic projects from university and industrial sponsors. Formulation of specifications, consideration of alternative solutions, feasibility considerations, detailed system descriptions, economic factors, safety, reliability, aesthetics, ethics and social impact.

10.2.7 Course mission/goal/objectives

Here is final project for student to finish 5 years in university.

10.2.8 Learning outcomes

This is the capstone design course

- Research, develop, present, and defend a design project proposal that includes a functional decomposition, Gantt chart, work breakdown, and plan to assign human resources to the project.
- Present written engineering project status reports.
- Demonstrate and defend a prototype design to a technical audience.
- Complete the proposed project under budgetary, safety, environmental, and socioeconomic, human factor, etc. constraints. The constraints are project dependent.
- Make a public oral presentation of the results of an engineering design project in a format suitable for a technical audience.
- Demonstrate and defend the final result of their project to a technical audience, and discuss the social, environmental, and economic aspects of their project to a non-technical audience.

- Create a written project report that documents and archives all aspects of the design that is suitable for a technical audience and meets standards of the engineering profession.
- Make significant technical contributions to a team where each member has separately defined responsibilities independent of faculty oversight.

10.2.9 Course topics

- There are no required topics in this course due to the fact students are applying engineering principles learned in previous courses to the design of realistic, open-ended problems.

10.2.10 Course materials

Textbook

No required text books.

Reference books:

No required reference books.

10.2.11 Grading policy

Defend: 100%

Attendance policy: Follow current policy of the AP training.