

HKU 110 Religion

Course Number and Name

HKU 110: Religion

Credits and Contact Hours

2 Credit Hours (100 minutes per week)

Instructor's or Course Coordinator's Name

Instructor: Yulifni, Lilimiwirdi, Lecturers of Social Sciences

Course Coordinator: Yulifni, Lecturer of Social Sciences

Text Book, Title, Author, and Year

Text Book

Sofyan S, 2004. MKPK Pendidikan Agama Islam. Bandung: Alfabeta.

Muhammad, S., 2000. Terjemahan. Sabar Prisai Seorang Mukmin. Jakarta: Pustaka Azzam.

Baiquni, A., 1994. Al-Qur'an Ilmu Pengetahuan dan Teknologi. Yogyakarta: Dana Bhakti Wakap.

Faridl, Miftah, 2012. Islam dan Berbagai Aspeknya. Bandung: Pustaka.

Other Supplemental Materials

Optional References

Specific Course Information

Brief Description of the Content of The Course (Catalogue Description)

Introducing to Islamic Education, The Source of Religion and Islam Gospel, Morality, Islamic Law, Islam and Cotemporer Issues

Prerequisites or Co-Requisites

Indicate Whether a Required, Elective, or Selected Elective Course in the Program

Required Course for Industrial Engineering

Specific Goals for the Course

a. Specific Outcomes of Instruction

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

- i. Describe the scope of Islam, human nature in Islam perspective, and the definition of islam
- ii. Describe the source of religion and islam gospel generally
- iii. Explain the about morality in and the correlation with islam
- iv. Describe islamic law correctly
- v. Explain the definition of inter-religious harmony and apply in daily life
- vi. Describe the perspective islam about mysticism

vii. Describe the scope and correlation between islam and economy, society, politic, philosophy, culture

b. *Explicitly indicate which of The Student Outcomes Listed in Criterion 3 or Any Other Outcomes are addressed by The Course*

Course addresses/ supports ABET Student Outcome(s): 4, 7

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe the scope of Islam, human nature in Islam perspective, and the definition of islam	7
ii.	Ability to describe the source of religion and islam gospel generally	4
iii.	Ability to explain the about morality in and the correlation with islam	4
iv.	Ability to describe islamic law correctly	4
v.	Ability to explain the definition of inter-religious harmony and apply in daily life	4
vi.	Ability to describe the perspective islam about mysticism	7
vii.	Ability to describe the scope and correlation between islam and economy, society, politic, philosophy, culture	4, 7

Brief List of Topics to be covered

- i. Introducing to Islamic Education
- ii. Human in Islam Perspective
- iii. Islam Religious
- iv. The Source of Religion and Islam Gospel
- v. Morality
- vi. Islamic Law (Syari'at)
- vii. Inter-Religious Harmony
- viii. Islam and Mysticism
- ix. Islam and Economy
- x. Religion and Society
- xi. Islam and Politic
- xii. Islam and Philosophy
- xiii. Islam and Culture
- xiv. Islam Practice

SSI 110
Bahasa Indonesia

Course number and name

SSI 110: Bahasa Indonesia

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Lilimiwirdi, Ria Febrina, Lecturers of Linguistics Department

Course coordinator: Ria Febrina, Lecturer of Linguistics Department

Text book, title, author, and year

Text book

Finoza, Laminuddin. 2004. Komposisi Bahasa Indonesia untuk Mahasiswa Non Jurusan Bahasa. Jakarta: Diksi Insan Mulia.

Keraf, Gorys. 2001. Komposisi. Ende: Nusa Indah.

Nadra (ed). 2006. Penulisan Karya Ilmiah. Padang: Andalas University Press.

Widjono HS. 2005. Bahasa Indonesia Mata Kuliah Pengembangan Kepribadian di Perguruan Tinggi. Jakarta: PT. Grasindo.

TIM Penyusun. 2011. Kamus Besar Bahasa Indonesia. Jakarta: Gramedia.

Specific course information

Brief description of the content of the course (catalog description)

Introduction, EYD, read effectively, scanning and skimming processes, arrange effective sentences, arrange effective paragraph, choosing topic, theme and essay writing, notation and bibliography, write abstract and conclusion and write effective presentation.

Pre-requisites or co-requisites

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Read scientific references effectively
- ii. Write scientific report effectively
- iii. Present scientific report effectively

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 3

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to Describe the function and language tune.	3
ii.	Ability to Describe types and word sense	3
iii.	Ability to Describe and identify diction	3

Brief list of topics to be covered

- i. Introduction
- ii. EYD
- iii. Read effectively
- iv. Scanning and skimming processes
- v. Arrange effective sentences
- vi. Arrange effective paragraph
- viii. Choosing topic, theme and essay writing
- viii. Notation and bibliography
- ix. Write abstract and conclusion
- x. Write effective presentation

PAK 110
Basic Chemistry

Course number and name

PAK 110: Basic Chemistry

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Yulia Eka Putri, Deswati, Lecturers of Chemical Department

Course coordinator: Deswati, Senior Lecturer of Chemical Department

Text book, title, author, and year

Text book

Whitten, K.W., Davis, R., Peck, M. L., Stanley G. G., 2004, *General Chemistry*, 7th – Ed, Thompson Books/Cole, USA.

Silberberg, M.S., 2003, *Chemistry: The Molecular Nature of Matter and Change*, 3rd – Ed, the McGraw-Hill Companies, Inc., USA

Chang, Raymond, 2003, *Kimia Dasar, Konsep-konsen Inti*, Volume 1 and 2, Third Chapter, Erlangga

Other supplemental materials

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Optional references

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Specific course information

Brief description of the content of the course (catalogue description)

Introduction, introduction of chemistry and applications, atom calculation, molecule and water, chemistry equation and Mole concept, chemical reaction and liquid, atom structure and periodic nature, thermodynamic, chemical kinetics, chemical equilibrium, metal and material .

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Describe the general of chemistry science and how and applied in engineering

- ii. Describe and identify types of atom
- iii. Describe the concept of molecule and water, capable and calculate it
- iv. Describe and calculate chemistry and mole equations
- v. Describe and identify chemical and liquid reactions
- vi. Describe and read periodic table and determine atom structure
- vii. Describe and calculate thermodynamic
- viii. Describe and calculate chemical kinetics
- ix. Describe and calculate chemical equilibrium and its application
- x. Describe chemical structure in metal and material

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe the general of chemistry science and how to applied into engineering	1
ii.	Ability to describe and identify types of atom	1
iii.	Ability to describe the concept of molecule and water, capable to calculate it	1
iv.	Ability to describe and calculate chemistry and mole equations	1
v.	Ability to describe and identify chemical and liquid reactions	1
vi.	Ability to describe and read periodic table to determine atom structure	1
vii.	Ability to describe and calculate thermodynamic	1
viii.	Ability to describe and calculate chemical kinetics	1
ix.	Ability to describe and calculate chemical equilibrium and its application	1
x.	Ability to describe chemical structure in metal and material	1

Brief list of topics to be covered

- i. Introduction and study contract
- ii. Introduction of chemistry and its applications
- iii. Atom measuring
- iv. Molecule and water
- v. Mole concept and chemical equation
- vi. Chemical and liquid reactions
- vii. Atom structure and periodic nature

- viii. Thermodynamic
- ix. Chemical kinetic
- x. Chemical equilibrium
- xi. Metal and solid material

SSE 127
English I

Course number and name

SSE 127: English I

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Yoffie Kharisma Dewi, Shally Amna, Selfa Idriani, Lecturers of English Department

Course coordinator: Yoffie Kharisma Dewi, Lecturer of English Department

Text book, title, author, and year

Text book

Mark Ibbotson. (2008). Cambridge English for Engineering Student's Book, Cambridge University Press

Other supplemental materials

Optional references

Specific course information

Brief description of the content of the course (catalogue description)

Topics in English I include verbs and modals, causative, conditionals, passives, nouns, determiners, comparatives, conjunctions, and parallel structure. It also discuss about reading English text such as previewing, reading for main ideas, using context for vocabulary, scanning, making inferences, identifying exceptions, and locating references

Pre-requisites or co-requisites

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Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Use English language correctly
- ii. Read English text effectively

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 3

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to use English language correctly	3
ii.	Ability to read English text effectively	3

Brief list of topics to be covered

- i. Verbs and modals
- ii. Causative
- iii. Conditionals
- iv. Passives
- v. Nouns
- vi. Determiners
- vii. Comparatives
- viii. Conjunctions
- ix. Parallel Structure
- x. Previewing
- xi. Reading for main ideas
- xii. Using context for vocabulary
- xiii. Scanning
- xiv. Making inferences
- xv. Identifying exceptions
- xvi. Locating references

PAM 111
Calculus I

Course number and name

PAM 111: Calculus I

Credits and contact hours

4 Credit Hours (200 minutes per week)

Instructor's or course coordinator's name

Instructor: Ahmad Iqbal Baqi, Budi Rudianto, Lecturers of Mathematics Department

Course coordinator: Ahmad Iqbal Baqi, Senior Lecturer of Mathematics Department

Text book, title, author, and year

Text book

Martono, Koko. Teori, Soal-Jawab dan Pembahasan Kalkulus, Volume 1-5 ITB

Purcell, Edwin J., Kalkulus dan Geometri Analisis, translated by Rawuh, volume 1, Erlangga

Other supplemental materials

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Optional references

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Specific course information

Brief description of the content of the course (catalogue description)

Function of Cartesian, Limit and continuity, derivatives in mathematics, formulas of derivative function algebra, the using of derivatives in mathematics, integral, transcendent functions, and derivative of transcendent functions.

Pre-requisites or co-requisites

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Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Describe and identify the function and draw it into Cartesian
- ii. Describe the concept of limit and continuity and capable to calculate the limit functions then check continuity of the function.
- iii. Describe the concept of derivative mathematics and capable proving derivative functions and calculating derivative.

- iv. Describe to implement the formula of derivative algebraic functions
- v. Describe to implement derivative concept into real case.
- vi. Describe to calculate anti-derivative of algebraic functions
- vii. Describe the concept and capable to calculate transcendent functions

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe and identify the function and draw it into Cartesian.	1
ii.	Ability to describe the concept of limit and continuity and capable to calculate the limit functions then check continuity of the function.	1
iii.	Ability to describe the concept of derivative mathematics and capable proving derivative functions and calculating derivative.	1
iv.	Ability to describe to implement the formula of derivative algebraic functions	1
v.	Ability to describe to implement derivative concept into real case.	1
vi.	Ability to describe to calculate anti-derivative of algebraic functions	1
vii.	Ability to describe the concept and capable to calculate transcendent functions	1

Brief list of topics to be covered

- i. Introduction
- ii. Function of Cartesian
- iii. Limit and continuity
- iv. Derivative mathematics
 - v. The using of derivative mathematics
- vi. Transcendent function

PAP 113
Basic Physics I

Course Number and Name

PAP 113: Basic Physics I

Credits and Contact Hours

4 Credit Hours (200 minutes per week)

Instructor's or Course Coordinator's Name

Instructor: Alimin Mahyuddin, Mora, Dwi Puji Puryanti, Lecturers of Department of Physics

Course Coordinator: Alimin Mahyuddin, Senior Lecturer of Department of Physics

Text Book, Title, Author, and Year

Text Book

Sears, F.W. and Zemansky, M.W., 1994, Fisika Untuk Universitas 1, Bina Cipta, Jakarta

Halliday, D. and Resnick, R., 1999, Fisika, Erlangga, Jakarta

Beiser, A., 1990, Konsep Fisika Modern, Edisi keempat, Erlangga, Jakarta.

Other Supplemental Materials

Sutrisno, 1994, Seri Fisika: Fisika Dasar, ITB, Bandung.

Optional References

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Specific Course Information

Brief Description of the Content of the Course (Catalogue Description)

The topics of this course include Measurement and Units, One-Dimensional Motion, Free Fall Motion, Vectors and Uses in Three-Dimensional, Motion Kinematics with Two-Dimensional Motion Approach, Relative Motion, Uniform Circular Motion, Newton's 3rd Law about Motion and The Case, Work and Energy, Kinematics and Dynamics Rotations, Particle Systems, Momentum and Conservation of Momentum, Static Equilibrium of Rigid Body, Simple Harmonic Motion, Solid and Fluid Mechanic, Static and Dynamic Fluid, Kinetic Theory of Gases, Thermodynamic 1st Law, Thermodynamic 2nd Law.

Prerequisites or Co-Requisites

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Indicate Whether a Required, Elective, or Selected Elective Course in the Program

Required Course for Industrial Engineering

Specific Goals for the Course

a. *Specific Outcomes of Instruction*

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

- i. Explain and apply the concept of mechanics and heat in certain situations

- ii. Explain physic phenomenon of motion and work
- iii. Represent mechanic and heat case mathematically in certain situations.
- iv. Apply the phenomenon of fluid and heat based on Archimedes and Thermodynamic laws.

b. *Explicitly Indicate which of The Student Outcomes Listed in Criterion 3 or Any Other Outcomes are Addressed by The Course*

Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain and apply the concept of mechanics and heat in certain situations	1
ii.	Ability to explain physic phenomenon of motion and work.	1
iii.	Ability to represent mechanic and heat case mathematically in certain situations.	1
iv.	Ability to apply the phenomenon of fluid and heat based on Archimedes and Thermodynamic laws.	1

Brief List of Topics to be covered

- i. Measurement and Units
- ii. Kinematics of Motion
- iii. One-Dimentional Motion
- iv. Free Fall Motion
- v. Parabola Motion
- vi. Uniform Circular Motion
- vii. Newton's 3rd Law
- viii. Work and Energy
- ix. Kinematics and Dynamics Rotations
- x. Particle Systems
- xi. Momentum
- xii. Rigid Body
- xiii. Simple Harmonic Motion
- xiv. Solid and Fluid Mechanic
- xv. Static and Dynamic Fluid
- xvi. Kinetic Theory of Gases
- xvii. Thermodynamic 1st Law
- xviii. Thermodynamic 2nd Law

TIN 101
Introduction to Industrial Engineering

Course number and name

TIN 101: Introduction to Industrial Engineering

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Ahmad Syafruddin Indrapriyatna, Elita Amrina, Jonrinaldi, Hilma Raimona Zadry, Eri Wirdianto, Feri Afrinaldi, Reiny Patrisina, Lecturers of Industrial Engineering

Course coordinator: Jonrinaldi, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Turner, Mize, Case and Nazemetz. (1993). Introduction to Industrial and Systems Engineering (3rd Edition), Prentice-Hall.

Salvendy, G. (2001). Handbook of Industrial Engineering (Edisi Ketiga), John Wiley & Sons, Inc.

Other supplemental materials

Work Systems and Methods, Measurement and Management of Work. Groover, Mikell P. Prentice Hall. 2007

Introduction to Operations Research. Hillier, Frederick S. and Lieberman, Gerald J. McGraw-Hill, 10th Edition. 2015.

Engineering Economic Analysis. Newnan, Donald G., Lavelle, Jerome P., and Eschenbach, Ted G. Oxford University Press, 12th Edition. 2013

Facilities Planning. Tompkins, James A., White, John A., Bozer, Yavuz A. and Tanchoco, J. M. A. Wiley, 4th Edition. 2010.

Introduction to Statistical Quality Control. Montgomery, D. C. Wiley, 7th edition. 2013

Introduction to Human Factors and Ergonomics for Engineers. Lehto, Mark R. and Landry, Steven J. CRC Press, 2nd Edition. 2013

Production and Operations Analysis, 7th Edition. Nahmias, S. and T. Lennon Olsen. Waveland Press, Inc. 2015

Supply Chain Management: Strategy, Planning, and Operations. Chopra, Sunil, and Meindl, Peter. Pearson, 6th Edition, 2015

Managing Engineering and Technology. Morse, Lucy C. and Babcock, Daniel L. Prentice Hall, 6th Edition. 2013

Goetsch, D. (2015). Occupational Safety and Health for Technologists, Engineers, and Managers (8th edn.). Englewood Cliffs, NJ: Prentice-Hall

Management Information Systems: Managing the Digital Firm 14th Edition. Laudon, K.C., & Laudon, J.P. Pearson Education, Inc. 2016)

Product Design and Development. Ulrich, Karl T. and Eppinger, Steven D. McGraw- Hill/Irwin, 5th Edition. 2011

Systems Engineering and Analysis. Blanchard, Benjamin S. and Fabrycky, Wolter J. Pearson, 5th Edition. 2011.

Optional references

Pengantar Teknik Industri, USU, ITB

Specific course information

Brief description of the content of the course (catalogue description)

The topics of this course include history and development of Industrial Engineering, ethics and professional organization of IE, introduction of integrated system in industrial engineering, introduction to IE UNAND curriculum including body of knowledge of Industrial Engineering, Introduction to statistical analysis, introduction to work design and measurement, ergonomics and human factor, operations engineering and management, operations research and analysis.

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Explain the history, definition and development of industrial engineering
- ii. Explain the profession, ethics and professional organization in industrial engineering
- iii. Explain the concept of integrated system in industrial engineering perspective regarding decision making
- iv. Explain appropriate methods regarding statistical analysis used by industrial engineers to solve the problem
- v. Explain appropriate methods regarding industrial engineering discipline used by industrial engineers to solve the problem

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1, 4, 7

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the history, definition and development of industrial engineering	4

ii.	Ability to explain the profession, ethics and professional organization in industrial engineering	4
iii.	Ability to explain the concept of integrated system in industrial engineering perspective regarding decision making	1, 4
iv.	Ability to explain appropriate methods regarding industrial engineering discipline used by industrial engineers to solve the problem	1, 2, 6
v.	Ability to explain appropriate methods regarding statistical analysis used by industrial engineers to solve the problem	1, 2, 6

Brief list of topics to be covered

- i. Introduction, definition, history and development of Industrial Engineering
- ii. Profession, ethics and professional organization of Industrial Engineering
- iii. Introduction to the concept of integrated system in Industrial Engineering
- iv. Introduction to IE Unand Curriculum (including body of knowledge of IE)
- v. Introduction to statistical analysis (population and sample, introduction to probability theory, descriptive statistics versus inferential statistics)
- vi. Introduction to work design and measurement
- vii. Introduction to ergonomics and human factor
- viii. Introduction to operation engineering and management
- ix. Introduction to quality engineering and management
- x. Introduction to engineering management
- xi. Introduction to operations research and analysis
- xii. Introduction to supply chain management and information engineering
- xiii. Introduction to product design and development and design of system engineering

TIN 103
Engineering Drawing

Course number and name

TIN 103: Engineering Drawing

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Taufik, Alfadhlan, Wisnel, Dina Rahmayanti, Lecturers of Industrial Engineering

Course coordinator: Alfadhlan, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Sato G.T., Hartanto N.S., MECHANICAL DRAWING ACCORDING TO ISO STANDARDS, 10th Edition, Pradnya Paramita, Jakarta, 2003. (in Indonesian)

Tickoo, SOLIDWORKS FOR DESIGNERS RELEASE 2004, CAD/CIM Technologies, USA, 2003.

Other supplemental materials

K. Venkata Reddy, TEXTBOOK OF ENGINEERING DRAWING, BS. Publication, 2nd Edition, 2008

(Optional references)

Specific course information

Brief description of the content of the course (catalogue description)

Introduction to engineering drawing, standards in mechanical drawing, drawing instrument, synthesis of geometry, lines and the usage, drawing projection (isometric, America, Europe), freehand sketching, auxiliary views, sections of solids, dimension and tolerance, simplification of drawing, composition drawing, shape details, symbols in drawing. This course is also equipped with lab activity to teach drawing skills using CAD software which specific to mechanical drawing that is Solid Works

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the function and properties of engineering drawing as engineering language and drawing handling
 - ii. Draw basic constructions and curved lines
 - iii. Present 3D sketch
 - iv. Explain and use projection rules and basics to present drawing
 - v. Apply the rules to draw cut sketch
 - vi. Apply the specific drawing rules
 - vii. Apply dimension rules in the drawing
 - viii. Apply the simplification rules in the drawing
 - ix. Explain the linear tolerance, angle tolerance and geometric tolerance
 - x. Use CAD software to create the 2D and 3D drawing in CAD system, and complete engineering drawing including providing dimensions.
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*
- Course addresses/ supports ABET Student Outcome(s): 1, 2, 4, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Explain the function and characteristics of engineering drawing as engineering language and drawing handling	1, 4
ii.	Draw basic constructions and curved lines	1, 2, 6
iii.	Present 3D sketch	1, 4
iv.	Explain and use projection rules and basics to present drawing	1, 2, 6
v.	Apply the rules to draw cut sketch	1, 2, 6
vi.	Apply the specific drawing rules	1, 2, 6
vii.	Apply dimension rules in the drawing	1, 2, 6
viii.	Apply the simplification rules in the drawing	1, 2, 4, 6
ix.	Explain the linear tolerance, angle tolerance and geometric tolerance	1
x.	Use CAD software to create the 2D and 3D drawing in CAD system, and complete engineering drawing including providing dimensions	1, 2, 6

Brief list of topics to be covered

- i. Drawing functions and properties as a engineering language and drawing handling
- ii. Lines and Letters in drawing
- iii. Presenting 3D object

- iv. Projection rules and basics in drawing
 - v. The rules in cut sketch
- vi. The specific drawing rules
- vii. Dimension rules in drawing
- viii. Drawing simplification
 - ix. The linear tolerance, angle tolerance and geometric tolerance
 - x. Drawing sketch using Solidworks
 - xi. Drawing 3D sketch using Solidworks
 - xii. Drawing 2D sketch using Solidworks
- xiii. Completing 2D drawing with dimension and presenting complete drawing

HKU 120
Pancasila and Citizenship

Course number and name

HKU 120: Pancasila and Citizenship

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Misnar Syam, Ikhsan Yusda, Lecturers of Law Department

Course coordinator: Misnar Syam, Lecturer of Law Department

Text book, title, author, and year

Text book

Kaelan. 2004. Pendidikan Pancasila, edisi 8. Yogyakarta: Paradigma

Sarbini, Syahrial. 2009. Pendidikan Pancasila di Perguruan Tinggi, cetakan ke-3. Bogor: Ghalia Indonesia

Budiyono, Kabul. 2010. Pendidikan Pancasila untuk Perguruan Tinggi, cetakan ke-2. Bandung: Alfabeta

Budiarjo, Miriam. 1996. Demokrasi di Indonesia, Demokrasi Parlementer, dan demokrasi Pancasila. Jakarta: Gramedia

Kamalpasha, Musthopa. 2002. Pendidikan Kewarganegaraan. Yogyakarta: Citra Karsa Mandiri

Other supplemental materials

Konstitusi Indonesia UUD 1945 dan Amandemen I, II, III, dan IV Plus Piagam Jakarta, Konstitusi Republik

Indonesia Serikat, UUDS 1950 dan Dekrit Presiden 5 Juli 1959-cet ke-2. 2010. Yogyakarta: Pustaka Timur

Tutik, Titik Triwulan; Trianto. 2007. Falsafah Negara dan Pendidikan Kewarganegaraan, cetakan ke-1. Jakarta: Prestasi Pustaka Publisher

Abdullah, Rozali. 2002. Perkembangan HAM dan Keberadaan Peradilan di Indonesia. Jakarta: Ghalia Indonesia

Budiarjo, Miriam. 1987. Dasar-dasar Ilmu Politik. Jakarta: Gramedia Pustaka Media

Basric Chaidir, Ed. 1994. Pemantapan Pembangunan Melalui Pendekatan Ketahanan Nasional. Jakarta: Program Magister PKN-UI

Optional references

Tutik, Titik Triwulan; Trianto. 2007. Falsafah Negara dan Pendidikan Kewarganegaraan, cetakan ke-1. Jakarta: Prestasi Pustaka Publisher

Specific course information

Brief description of the content of the course (catalogue description)

Pancasila and civics education courses is a basic subject personality to digging and implement the values and wisdom that crystallized in Pancasila, so in order to make it be a culture and find forms of relevance for students in applying science and technology. It also discuss about nation and nationalism, constitution, human right, archipelago concept, geopolitics and Indonesian strategies.

Pre-requisites or co-requisites

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Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Describes the philosophy of Pancasila and its development strategy
- ii. Make Pancasila as the basic orientation in the development of science, technology, and art with a sense of patriotism, nationalism, and humanity
- iii. Becomes personal character Indonesian system based on those values of Pancasila
- iv. Identify the advantages and importance of citizenship as media to show national identity promoting democracy values
- v. Determine essential national identity
- vi. Identify understanding about the state
- vii. Show basic concept of constitution in Indonesia and its changes and development
- viii. Identify understanding about the citizen
- ix. Explain and evaluate means and essence of democracy, element of democracy, principles and parameters of democracy and history of democracy in Indonesia
- x. Show and determine human right concept
- xi. Identify and evaluate area autonomy, decentralization, autonomy concept
- xii. Identify and interpret the rules of law
- xiii. Explain the concept, urgency and basic concept of the good government
- xiv. Formulate and synthesis the understanding of Indonesian geopolitics
- xv. Interpret and identify Indonesian geopolitics, astra-gatra concept and national defence of Indonesia

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Describes the philosophy of Pancasila and its development strategy	4

ii.	Make Pancasila as the basic orientation in the development of science, technology, and art with a sense of patriotism, nationalism, and humanity	4
iii.	Becomes personal character Indonesian system based on those values of Pancasila	4
iv.	Identify the advantages and importance of citizenship as media to show national identity promoting democracy values	4
v.	Determine essential national identity	4
vi.	Identify understanding about the state	4
vii.	Show basic concept of constitution in Indonesia and its changes and development	4
viii.	Identify understanding about the citizen	4
ix.	Explain and evaluate means and essence of democracy, element of democracy, principles and parameters of democracy and history of democracy in Indonesia	4
x.	Show and determine human right concept	4
xi.	Identify and evaluate area autonomy, decentralization, autonomy concept	4
xii.	Identify and interpret the rules of law	4
xiii.	Explain the concept, urgency and basic concept of the good government	4
xiv.	Formulate and synthesis the understanding of Indonesian geopolitics	4
xv.	Interpret and identify Indonesian geopolitics, astra-gatra concept and national defence of Indonesia	4

Brief list of topics to be covered

- i. Introduction and study contract
- ii. Pancasila philosophy
- iii. Pancasila as the philosophy system
- iv. Pancasila and the ideology of the nation
- v. Pancasila as a paradigm of life in the community, nation, and state
- vi. Introduction to citizenship education
- vii. State and nationalism
- viii. Constitution
- ix. Human right
- x. Archipelago concept and national defence
- xi. Geopolitics and Geo-strategy of Indonesia
- xii. Presentation of group project

SSE 128
English II

Course number and name

SSE 128: English II

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Yoffie Kharisma Dewi, Shally Amna, Selfa Idriani, Lecturers of English Department

Course coordinator: Yoffie Kharisma Dewi, Lecturer of English Department

Text book, title, author, and year

Text book

Mark Ibbotson. (2008). Cambridge English for Engineering Student's Book, Cambridge University Press

Other supplemental materials

Specific course information

Brief description of the content of the course (catalogue description)

This course discuss about how to write in English, writing problem statement using point of view concept, compare and contrast, making paragraph with paraphrase and citation from references, fluency, and cohesion, making conclusion, doing revision (check grammar, spelling and punctuation, comma, semicolon, colon or dash), comment on the data from the table, graph, and diagram. Effective presentation and discussion.

Pre requisites or co-requisites

SSE 127

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Write in English effectively
- ii. Share idea in English effectively

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 3

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to write in English effectively	3
ii.	Ability to share idea in English effectively	3

Brief list of topics to be covered

- i. Introduction
- ii. How to make note from references
- iii. Problem statement using point of view concept, compare and contrast
- iv. Making paragraph using paraphrase and citation from any sources
- v. Fluency and cohesion
- vi. Making conclusion
- vii. Revision (check grammar, spelling and punctuation, comma, semicolon, colon or dash)
- viii. Comment on the data from table, graph and diagram
- ix. Effective presentation and discussion: how to present and discuss, using presentation and discussion and comment on the data

TLI 110
Environmental Knowledge

Course number and name

TLI 110 : Environmental Knowledge

Credits and contact hours

2 Credit Hours (100 minutes per weeks)

Instructor's or course coordinator's name

Instructor: Budhi Primasari, Fadjar Goembira, Taufik Ihsan, Lecturers of Environmental Engineering

Course coordinator: Budhi Primasari, Senior Lecturer of Environmental Engineering

Text book, title, author, and year

Text book

G. Tyler Miller, JR. & Scott Spoolman. 2008. Environmental Science: Problems, Concepts, and Solutions, Twelfth edition. Thomson Learning, Inc.

Michael Allaby. 2000. Basics of Environmental Science, 2nd Edition. Routledge.

Other supplemental materials

Estes, Jonathan. 2009. Smart green: how to implement sustainable business practices in any industry and make money. John Wiley & Sons, Inc.

Slamet, J.S. 2009. Kesehatan Lingkungan, Gajah Mada University Press, Cetakan kedelapan.

Optional references

Specific course information

Brief description of the content of the course (catalog description)

Introduction to environmental science, ecology, environmental carrying capacity, population, living environment, natural resources, sustainable development, environmental valuation, environmental health, environmental pollution and environmental management, and sustainable business practices in industry.

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the components of the environment.
 - ii. Explain the definition of ecology, ecosystem (definition, component, function), population, habitat, biodiversity, adaptation, energy, material, environmental carrying capacity, damage, life strategy, human quality of life
 - iii. Explain the population, philosophy, population policy, population problem approach and solving
 - iv. Explain the definition of living environment, the management of living environment, the factors affecting living environment, Benefit and risk of environment, sustainable development.
 - v. Explain the natural resources, classification and problems, environmental problems in economic perspective
 - vi. Explain the environmental health, definition and scope, development of environmental health, environmental health problems (drink water, waste water, rubbish, housing, supervision of arthropod and orthodontia, food problems)
 - vii. Explain the environmental pollution, definition, types of pollution (water, sand, air)
 - viii. Explain the environmental management, AMDAL, ISO 14000, clean production
- b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i	Ability to explain the components of the environment.	1, 4
ii.	Ability to explain the definition of ecology, ecosystem (definition, component, function), population, habitat, biodiversity, adaptation, energy, material, environmental carrying capacity, damage, life strategy, human quality of life	1, 4
iii	Ability to explain the population, philosophy, population policy, population problem approach and solving	1, 4
iv	Ability to explain the definition of living environment, the management of living environment, the factors affecting living environment, Benefit and risk of environment, sustainable development.	1, 4
v	Ability to explain the natural resources, classification and problems, environmental problems in economic perspective	1, 4
vi	Ability to explain the environmental health, definition and scope, development of environmental health, environmental health	1, 4

	problems (drink water, waste water, rubbish, housing, supervision of arthropod and orthodontia, food problems)	
vii	Ability to explain the environmental pollution, definition, types of pollution (water, sand, air)	1, 4
viii	Ability to explain the environmental management, AMDAL, ISO 14000, clean production	1, 4

Brief list of topics to be covered

- i. Introduction to Environmental Knowledge
- ii. Ecology
- iii. Environmental carrying capacity, population
- iv. Living environment, natural resources, sustainable development
- v. Environmental valuation
- vi. Environmental Health
- vii. Environmental Pollution
- viii. Environmental Management

PAM 112
Calculus II

Course number and name

PAM 112: Calculus II

Credits and contact hours

4 Credit Hours (200 minutes per week)

Instructor's or course coordinator's name

Instructor: Ahmad Iqbal Baqi, Budi Rudianto, Lecturers of Mathematics Department

Course coordinator: Ahmad Iqbal Baqi, Senior Lecturer of Mathematics Department

Text book, title, author, and year

Text book

Martono, Koko, Theory, Question-Answer, and Calculus Discussion, Jilid 6th – 10th, ITB

Purcell, Edwin J., Calculus and Analyse of Geometry, translation Rawuh, Jilid 2nd, Erlangga

Specific course information

Brief description of the content of the course (catalogue description)

Introduction, Definite Integral, Using Definite Integral, Integral Technique, Conic and Pole Coordinate, Improper Integral, and Simple Differential Equation.

Pre-requisites or co-requisites

PAM 111

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Describe and calculate integral and solve the simple differential equation and the problems in Industrial Engineering field.
- ii. Apply integral concept and simple differential equation as a problem solver in Industrial Engineering field.

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe and calculate integral and solve the simple differential equation and the problems in Industrial Engineering field.	1
ii.	Ability to apply integral concept and simple differential equation as a problem solver in Industrial Engineering field	1

Brief list of topics to be covered

- i. Introduction
- ii. Definition of Integral
- iii. Using Definite Integral
- iv. Integral Technique
- v. Conic and Pole Coordinate
- vi. Improper Integral
- vii. Simple Differential Equation.

PAP 114
Basic Physics II

Course number and name

PAP 114: Basic Physics II

Credits and contact hours

4 Credit Hours (200 minutes per week)

Instructor's or course coordinator's name

Instructor: Ardian Putra, Dahyunir Dahlan, Dwi Puji Astuti, Rahmat Rasyid, Lecturers of Department of Physics

Course Coordinator: Ardhian Putra, Lecturer of Department of Physics

Text book, title, author, and year

Text book

Tipler, P.A., Fisika untuk Sains dan Teknik: Jilid 2; Edisi Ketiga, Penerbit Erlangga, Jakarta, 1998.

Other supplemental materials

Giancoli, D.C., Fisika: Jilid 2, Edisi Kelima, Penerbit Erlangga, Jakarta, 2001.

Halliday, D. dan R. Resnik, Fisika, Jilid 2, Edisi Ketiga, Terjemahan P.Silaban dan E. Sucipto, Penerbit Erlangga, Jakarta, 1988.

Optional references

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Specific course information

Brief description of the content of the course (catalogue description)

This course is the second half of a two semester. The first half is PAP 113 Basic Physics I. This course discuss about the principles of: Properties of Electric Charges, Insulators and Conductors—Conduction Charge, Coulomb's Law, Electric Field, Continuous Charge Distribution, Power Flux and Gauss's Law, Electric Energy, Capacitance and Capacitors, Electric Current, Series of Direct Current Circuit—Kirchhoff's Law, Magnetic Field & Force, Application of Magnetic Force, Ampere's Law and Applications, EMF Induction, Faraday's law, Moving EMF, Lenz's Law, Generator, Inductance, Energy in Magnetic Field, AC circuit, RLC series circuit, Electromagnetic waves.

Pre-requisites or co-requisites

PAP 113

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the basic concepts and physics laws associated with electricity, magnetic, light and optic
- ii. Solve basic physics problems associated with electricity, magnetic, light and optic using appropriate physic laws and mathematical methods

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the basic concepts and physics laws associated with electricity, magnetic, light and optic	1
ii.	Ability to solve basic physics problems associated with electricity, magnetic, light and optic using appropriate physic laws and mathematical methods	1

Brief list of topics to be covered

- i. Introduction,
- ii. Electrostatics
- iii. Direct current
- iv. Magnetic Field & Force
- v. Sources of magnetic field
- vi. Electromagnetic induction
- vii. Electric current
- viii. Light and optic

TIN 104
Computer Programming

Course number and name

TIN 104: Computer Programming

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Insannul Kamil, Asmuliardi Muluk, Ikhwan Arief, Lecturers of Industrial Engineering

Course coordinator: Asmuliardi Muluk, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Algoritma & Pemrograman dalam Bahasa Pascal dan C, Edisi Revisi, Rinaldi Munir, Penerbit Informatika, 2011

Other supplemental materials

Object Oriented Programming using C#, Simon Kendal, bookboon.com, 2011.

(Optional references)

Specific course information

Brief description of the content of the course (catalogue description)

Introduction to algorithm and computer programming including programming algorithm, flowchart/ flow diagram, programming language, operating programming language, writing programming language, characters, constants and variables, operator, mathematical function, mathematical expression, input and output, conditional, looping, rows and matrices, application of programming

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Make and explain the simple algorithm
- ii. Use the editors of programming language
- iii. Use decision concept, looping, arrays, and methods in making the program/ application
- iv. Design the algorithm and make the program using the programming language

- v. Work in team
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to make and explain the simple algorithm	1, 3
ii.	Ability to use the editors of programming language	1, 2, 6
iii.	Ability to use decision concept, looping, arrays, and methods in making the program/ application	1
iv.	Ability to design the algorithm and make the program using the programming language	1, 2, 6
v.	Ability to work in team	3

Brief list of topics to be covered

- i. Introduction to computer programming
- ii. Algorithm
- iii. Programming language C#
- iv. Types of data, variables and constants
- v. Decision concepts: IF logic, IF plural and switch
- vi. Looping: For, while and Do-while
- vii. Arrays
- viii. OOP concepts and modular
- ix. Java language
- x. Industrial Revolution 4.0

TIN 106
Statics

Course number and name

TIN 106: Statics

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Taufik, Lecturer of Industrial Engineering

Course coordinator: Taufik, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Meriam, J.L., Kraige L.G., 2014. Engineering Mechanics: Statics, 8 Ed.

Other supplemental materials

(Optional references)

Specific course information

Brief description of the content of the course (catalogue description)

This course learns about force or vector at a simple structure; consist of reaction force, force in a stem, or a rub force.

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Define and calculate forces and particle equilibrium
- ii. Calculate distributed forces
- iii. Define and calculate moments
- iv. Apply the equilibrium concept and equivalence of force on a system
- v. Apply free body diagrams and equilibrium analysis techniques
- vi. Determine the center of gravity
- vii. Analyze truss structure, beams and frames
- viii. Calculate internal forces

- b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i	Define and calculate forces and particle equilibrium	1
ii	Calculate distributed forces	1
iii	Define and calculate moments	1
iv	Apply the equilibrium concept and equivalence of force on a system	1
v	Apply free body diagrams and equilibrium analysis techniques	1
vi	Determine the center of gravity	1
vii	Analyze truss structure, beams and frames	1
viii	Calculate internal forces	1

Brief list of topics to be covered

- i. Distributing forces and particle equilibrium
- ii. Moments
- iii. Free body diagram
- iv. Application and analysis of distributing forces and particle equilibrium on a system
- v. Center of gravity
- vi. Analysis of truss structure, beams and frames
- vii. Internal forces

TIN 108
Introduction to Economics

Course number and name

TIN 108: Introduction to Economics

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Rika Ampuh Hadiguna, Wisnel, Lecturers of Industrial Engineering

Course coordinator: Rika Ampuh Hadiguna, Professor of Industrial Engineering

Text book, title, author, and year

Text book

Roger LeRoy Miller. (2012). Economics today 16th ed. Addison-Wesley

Other supplemental materials

William A. McEachern. (2014). Macroeconomics; A Contemporary Introduction 10th ed. South-Western Cengage Learning

Michael Parkin. (2014). Microeconomics 11th ed. Pearson

(Optional references)

Specific course information

Brief description of the content of the course (catalogue description)

The definition of economics, Market theory, welfare theory, economics of work force market, Interaction between the company and global environment, in context of competitive and community welfare. It also discuss about corporate social responsibility to maintain stability of global and national economics and introduction to digital economics.

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the economic principles
- ii. Explain the comparative excellence theory
- iii. Analyze the supply and demand problems
- iv. Explain elasticity theory

- v. Analyze market efficiency
 - vi. Explain the roles of tax and tariff in the international trade
 - vii. Analyze the economics of industrial goods
 - viii. Identify competitive, monopoly, monopsony and oligopoly markets
 - ix. Explain the production factors
 - x. Identify the causes of imbalance of income and poverty
 - xi. Identify digital economic challenges in industrial revolution 4.0
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i	Ability to explain the economic principles	4
ii	Ability to explain the comparative excellence theory	4
iii	Ability to analyze the supply and demand problems	4
iv	Ability to explain elasticity theory	4
v	Ability to analyze market efficiency	4
vi	Ability to explain the roles of tax and tariff in the international trade	4
vii	Ability to analyze the economics of industrial goods	4
viii	Ability to identify competitive, monopoly, monopsony and oligopoly markets	4
ix	Ability to explain the production factors	4
x	Ability to identify the causes of imbalance of income and poverty	4
xi	Ability to identify digital economic challenges in industrial revolution 4.0	4

Brief list of topics to be covered

- viii. The principles of economics
 - ix. Comparative excellence
 - x. Supply and demand
 - xi. Elasticity theory
 - xii. Efficiency of market
- xiii. Tax and tariff
- xiv. The economics of industrial goods
 - xv. Competitive, monopoly, monopsony and oligopoly markets
- xvi. Production factors

xvii. Imbalance of income and poverty

PAM 213
Matrices and Vectors

Course number and name

PAM 213: Matrices and Vectors

Credits and contact hours

4 Credit Hours (200 minutes per week)

Instructor's or course coordinator's name

Instructor: I Made Arnawa, Lyra Yulianti, Monika Rianti Helmi, Zul Akmal, Lecturers of Mathematics Department

Course coordinator: I Made Arnawa, Professor of Mathematics Department

Text book, title, author, and year

Text book

Anton, Howard, Aljabar Linear Elementer, terjemah Pantur Silaban, Erlangga

Other supplemental materials

Faddeva, V. N., Computational Methods of Linear Algebra I, Dover

Optional references

Noble, B, Applied Linear Algebra, Prentice-Hall Inc

Specific course information

Brief description of the content of the course (catalogue description)

Matrices and Determinants, Systems of Linear Equations, Matrices and Determinants, of Vector in space within the-2 and-3 space, of Vector Spaces, Linear Transformations, Eigenvalues and Eigenvectors, Implementation Matrix and of Vector.

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Understand and identify the Linear Equation System (SPL) and modeling problems into SPL.
- ii. Understand the concept of matrix and able to write in a matrix along with the SPL able to finish.
- iii. Understand the concept of vectors in \mathbb{R}^2 and \mathbb{R}^3 as well as describe and perform operations on vector algebra.

- iv. Understand Space-n Euclides and Vector Spaces general and able to perform calculations on the vector algebra.
 - v. Understand linear transformation and able to able to determine a linear transformation from R^m to R^m .
 - vi. Understand the concept of value and eigenvectors and be able calculate it.
 - vii. Understanding the application of matrices and vectors on a variety of problems and able to resolve these problems.
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to understand and identify the Linear Equation System (SPL) and modeling problems into SPL.	1
ii.	Ability to understand the concept of matrix and able to write in a matrix along with the SPL able to finish.	1
iii.	Ability to understand the concept of vectors in R^2 and R^3 as well as describe and perform operations on vector algebra.	1
iv.	Ability to understand Space-n Euclides and Vector Spaces general and able to perform calculations on the vector algebra.	1
v.	Ability to understand linear transformation and able to able to determine a linear transformation from R^m to R^m .	1
vi.	Ability to understand the concept of value and eigenvectors and be able calculate it.	1
vii.	Ability to understand the application of matrices and vectors on a variety of problems and able to resolve these problems	1

Brief list of topics to be covered

- i. Systems of Linear Equations
- ii. Matrices and Determinants
- iii. Vectors in Space-2 and Space-3
- iv. Vector Spaces
- v. Linear Transformations
- vi. Eigenvalues and Eigenvectors
- vii. Implementation Matrix and Vector.

TIN 201
Engineering Materials

Course number and name

TIN201: Engineering Materials

Credits and contact hours

3 Credit Hours (100 minutes per weeks + 50 minutes lab work)

Instructor's or course coordinator's name

Instructor: Is Prima Nanda, Jon Affi, Oknovia Susanti, Lecturers of Mechanical Engineering

Course coordinator: Jon Affi, Senior Lecturer of Mechanical Engineering

Text book, title, author, and year

Text book

W. D. Callister Jr. dan D. G. Rethwisch (2009) Materials Science and Engineering An Introduction, 8th edition

Specific course information

Brief description of the content of the course (catalog description)

This course provides basic knowledge of the students about the types of materials, material properties, the standardization of materials, metal treatment, selecting appropriate material for a particular purpose in applying engineering concepts.

Pre-requisites or co-requisites

PAK110, PAP 113, PAP 114

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Describe the distinguish the material used for machinery and construction component
- ii. Describe the distinguish micro structure of steel, cast iron and chemical composition
- iii. Describe the distinguishing the mechanical properties of engineering materials and technologies
- iv. Apply the performing mechanical testing of material through tensile test, impact test, and non destructive test
- v. Interpret and understand the kind of non-destructive testing
- vi. Describe the distinguish well the structure and properties of metals
- vii. Describe well the relationship micro-structure and mechanical properties and is able to vary the micro-structure to obtain the desired mechanical properties

- viii. Describe the differentiation and create standards-compliant code various types of materials engineering, and is able to distinguish the properties of metals and non-metals
 - ix. Determine the nature of ceramics, composites and advanced materials
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 3, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe the distinguish the material used for machinery and construction component	1
ii.	Ability to describe the distinguish micro structure of steel, cast iron and chemical composition	1
iii.	Ability to distinguishing the mechanical properties of engineering materials and technologies	1
iv.	Ability to the performing mechanical testing of material through tensile test, impact test, and non destructive test	1, 6
v.	Ability to interpret and understand the kind of non-destructive testing	3, 6
vi.	Ability to describe the distinguish well the structure and properties of metals	1
vii.	Ability to describe well the relationship micro-structure and mechanical properties and is able to vary the micro-structure to obtain the desired mechanical properties	1, 3
viii	Ability to describe the differentiation and create standards-compliant code various types of materials engineering, and is able to distinguish the properties of metals and non-metals	1, 3
ix	Ability to determine the nature of ceramics, composites and advanced materials	1

Brief list of topics to be covered

- i. The introduction of material engineering and the general applications.
- ii. Material structure
- iii. Phase Diagrams
- iv. Phase Transformations in Metals
- v. Material properties: Mechanics properties, and chemical properties
- vi. Mechanics properties, and technology properties
- vii. Material characteristic and material testing

- viii. Structure and properties of metals
 - ix. Classification, coding and application of material engineering
 - x. Relationship of micro structure and mechanics properties and technology properties.
 - xi. Polymer, Ceramics, Composite and Advanced material
 - xii. Structure and polymer, ceramics, and composite properties

TIN 203
Manufacturing Processes

Course number and name

TIN 203: Manufacturing Processes

Credits and contact hours

3 Credit Hours (100 minutes per week + 50 minutes lab work)

Instructor's or course coordinator's name

Instructor: Ismet Hari Mulyadi, Adam Malik, Hendri Yanda, Wisnel, Berry Yuliandra,
Lecturers of Industrial and Mechanical Engineering

Course coordinator: Adam Malik, Senior Lecturer of Mechanical Engineering

Text book, title, author, and year

Text book

M. P. Groover (2006) Fundamental of Modern Manufacturing; John Wiley & Sons Inc

Kalpakjian, Serope, 2001. Manufacturing Engineering and Technology. Mew Jersey: Prentice Hall, Inc

Other supplemental materials

Scallan, Peter. 2003. Process Planning: The Design/Manufacturing Interface. Butterworth-Heinemann

De Garmo, P., 2001. Material and Processes. John Wiley, McMillan.

Optional references

B. H. Amstead, P. F. Ostwald, M. L. Begeman, (1987) Manufacturing Processes; John Wiley & Sons Inc

Specific course information

Brief description of the content of the course (catalogue description)

In this course students learn basic technology in machining processes including machining processes, casting, forming, powder metallurgy, polymer production, joining, and assembly. Focus on machining processes as main process such as turning, milling, boring, drilling, and grinding Process. It also discuss cutting machine technology such as age, material and geometry, machining coolant, and manufacturing properties and characteristics, selecting an appropriate manufacturing processes to produce the products considering technical aspect and time. This course is supported by practicum activity to describe how to operate the production using conventional machine tools.

Pre-requisites or co-requisites

TIN 103, TIN 106

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Describe manufacturing processes needed to produce a component of the product
- ii. Explain the characteristics of conventional machining processes (turning, frais, grinding, and abrasive processes)
- iii. Calculating parameters of optimal machining processes manufacturing system and technology
- iv. Describe chisel technology about its age, material, geometry
- v. Explain some coolant used in machining processes
- vi. Explain the characteristics and classification of casting
- vii. Explain the characteristics and classification of forming
- viii. Explain the characteristics and classification of powder metallurgy processes
- ix. Explain the characteristics and classification of polymer production processes
- x. Explain the characteristics and classification of joining processes
- xi. Distinguishing the types of assembly technology
- xii. Describe non-conventional machining processes
- xiii. Select the appropriate manufacturing processes to produce the products
- xiv. Operate conventional machine tools in producing the products

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe manufacturing processes needed to produce a component of the product	1
ii.	Ability to explain the characteristics of conventional machining processes (turning, frais, grinding, and abrasive processes)	1
iii.	Ability to calculating parameters of optimal machining processes manufacturing system and technology	1, 6
iv.	Ability to describe chisel technology about its age, material, geometry	1, 6
v.	Ability to explain some coolant used in machining processes	1
vi.	Ability to explain the characteristics and classification of casting	1

vii.	Ability to explain the characteristics and classification of forming	1
viii.	Ability to explain the characteristics and classification of powder metallurgy processes	1
ix.	Ability to explain the characteristics and classification of polymer production processes	1
x.	Ability to explain the characteristics and classification of joining processes	1
xi.	Ability to distinguishing the types of assembly technology	1
xii.	Ability to describe non-conventional machining processes	1
xiii.	Ability to select the appropriate manufacturing processes to produce the products	1, 6
xiv.	Ability to operate conventional machine tools in producing the products	1, 6

Brief list of topics to be covered

- i. Introduction to manufacturing processes
- ii. Introduction to conventional machining processes
- iii. Turning process
- iv. Frais process
- v. Grinding process
- vi. Cutting machine technology
- vii. Abrasive process
- viii. Casting process
- ix. Forming process
- x. Powder metallurgy process
- xi. Polymer production process
- xii. Joining process
- xiii. Assembly process
- xiv. Non-conventional machining process
- xv. Time calculation and process selection

TIN 205
Industrial Statistics I

Course number and name

TIN 205: Industrial Statistics I

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Alexie Herryandie BA., Difana Meilani, Eri Wirdianto, Feri Afrinaldi, Lecturers of Industrial Engineering

Course coordinator: Eri Wirdianto, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Applied Statistics and Probability for Engineers, Douglas C. Montgomery, George C. Runger, 6th edition, 2013

Other supplemental materials

Statistics for Engineering and the Sciences, Mendenhall, W., Sincich, T., Prentice Hall, New Jersey, 2007.

Probability and Statistics for Engineers & Scientists, Walpole, R.E., Myers, R.H., Myers, S.L., and Ye, K., Prentice-Hall, New Jersey, 2006

Specific course information

Brief description of the content of the course (catalog description)

In this course students learn to understand and to able applying probability theories in solving industrial engineering problems

Pre-requisites or co-requisites

PAM 112

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain statistical concept in analyzing data related to technique and knowledge
- ii. Use graph and numerical methods in summarizing and describing the data
- iii. Explain the concept and role of probability in inferential statistics

- iv. Use counting rule methods (multiplicative rule, permutation rule, partitions rule, combination rules in statistical cases.
 - v. Distinguish between discrete random variables and continue random variables and their parameters
 - vi. Use discrete and continue random variables in solving practical problems
 - vii. Use sampling distribution method in statistics and identify sampling distribution for use in statistical cases
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*
 Course addresses/ supports ABET Student Outcome(s): 1, 2, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain statistical concept in analyzing data related to technique and knowledge	1
ii.	Ability to use graph and numerical methods in summarizing and describing the data	1
iii.	Ability to explain the concept and role of probability in inferential statistics	1
iv.	Ability to use counting rule methods (multiplicative rule, permutation rule, partitions rule, combination rules in statistical cases.	1, 2, 6
v.	Ability to distinguish between discrete random variables and continue random variables and their parameters	1
vi.	Ability to use discrete and continue random variables in solving practical problems	1, 2, 6
vii.	Ability to use sampling distribution method in statistics and identify sampling distribution for use in statistical cases	1, 2, 6

Brief list of topics to be covered

- i. Introduction to statistic and probability theories
- ii. Descriptive statistic
- iii. Probability and probability distribution
- iv. Discrete Random variables
- v. Continues random variables
- vi. Sampling distribution

TIN 207
Work Systems Analysis and Design

Course number and name

TIN 207: Work Systems Analysis and Design

Credits and contact hours

2 Credit Hours (100 minutes per weeks)

Instructor's or course coordinator's name

Instructor: Lusi Susanti, Hilma Raimona Zadry, Desto Jumeno, Lecturers of Industrial Engineering

Course coordinator: Lusi Susanti, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Freivalds, A., 2009. Methods, Standards, and Work Design. 12th Edition. McGraw Hill International Edition.

Barnes, R.M. 1980. Motion and Time Study, Design and Measurement of Work. 7th Edition, New York: John Wiley & Sons.

Niebel, 2001. Methods, Standards, and Work Design. Tenth Edition. New York: McGraw Hill.

Other supplemental materials

Kroemer and Grandjean, 1997. Fitting the Task to the Human: A Text Book of Occupational Ergonomics. Fifth edition. CRC Press.

Optional references

Sutalaksana, dkk, 1979. Teknik Tata Cara Kerja. Bandung: Jurusan TI ITB.

Wignjosoebroto, S., 2008. Ergonomi Studi Gerak dan Waktu. Teknik Analisis untuk Peningkatan Produktivitas Kerja. Edisi Pertama, Cetakan Keempat. Penerbit Guna Widya.

Specific course information

Brief description of the content of the course (catalog description)

This course discuss the history of motion and time study in development of work method and techniques, how to measure motion and time study, analyze the result of measurement and use it to improve productivity and work efficiency, determine wage system, incentive and bonus in work system.

Pre-requisites or co-requisites

TIN 101

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Explain why motion and time study is important in industry
- ii. Explain the difference between added value and non-added value working activities
- iii. Use whole work charts as systematic tools to analyze and improve performance
- iv. Conduct time measurement using direct time study method
- v. Determine the necessary rating and allowance factors to calculate standard time
- vi. Conduct the necessary calculations to determine the standard time
- vii. Conduct time measurement using indirect time study method.
- viii. Use the standard time to determine the production target, number of workforce, wage payment system

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4, 6.

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
1.	Ability to explain why motion and time study is important in industry	2, 3
2.	Ability to explain the difference between added value and non-added value working activities	1, 2, 3
3.	Ability to use whole work charts as systematic tools to analyze and improve performance	1, 2, 6
4.	Ability to conduct time measurement using direct time study method	1, 2, 6
5.	Ability to determine the necessary rating and allowance factors to calculate standard time	1, 2, 6
6.	Ability to conduct the necessary calculations to determine the standard time	1, 2, 6
7.	Ability to conduct time measurement using indirect time study method.	1, 2, 6
8	Ability to use the standard time to determine the production target, number of workforce, wage payment system	1, 2, 4, 6

Brief list of topics to be covered

- i. The history of motion and time study
- ii. Motion study and motion Economy

- iii. The whole and local work charts
- iv. Direct time measurement
 - v. Indirect time measurement
- vi. Wage payment systems

TIN 209
Industrial Electronics

Course number and name

TIN 209: Industrial Electronics

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Primas Emeraldi, Hanalde Andre, Lecturers of Electrical Engineering

Course coordinator: Primas Emeraldi, Lecturer of Electrical Engineering

Text book, title, author, and year

Text book

Petruzella, F.D., Industrial Electronics, Mc.Graw-Hill, Singapore, 1996.

Other supplemental materials

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Optional references

-

Specific course information

Brief description of the content of the course (catalogue description)

This lecture provides knowledge about the use of technology in the electronics industry. This lecture discusses the electrical security systems, circuits and electronic equipment in industries that include: power distribution, power Electronics, industrial motors and generators. This knowledge is used by the industrial engineering degree to improve system performance in shop floor.

Pre-requisites or co-requisites

PAP 114

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Describe the safety procedure when working with electrical equipment.
- ii. Describe the equipment and industrial electrical diagrams.
- iii. Explain the fundamental of the electrical distribution system.
- iv. Distinguish between digital and analog signal and its IC operations.

- v. Describe the fundamental of the alternating Current (AC) and Direct Current (DC) generators.
 - vi. Describe the principles and applications of motor protection circuit.
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*
- Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe the safety procedure when working with electrical equipment.	1
ii.	Ability to describe the equipment and industrial electrical diagrams.	1
iii.	Ability to explain the fundamental of the electrical distribution system.	1
iv.	Ability to distinguish between digital and analog signal and its IC operations.	1
v.	Ability to describe the fundamental of the alternating Current (AC) and Direct Current (DC) generators.	1
vi.	Ability to describe the principles and applications of motor protection circuit	1

Brief list of topics to be covered

- i. Industrial Safety.
- ii. Diagram of Electrical Industry.
- iii. Transformer and Power Distribution System.
- iv. Power Electronics.
- v. Motor and industrial generator.
- vi. Motor Control Circuits

TIN 213
Professional Ethics

Course number and name

TIN 213: Professional Ethics

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Insannul Kamil, Rika Ampuh Hadiguna, Henmaidi, Lecturers of Electrical Engineering

Course coordinator: Insannul Kamil, Senior Lecturer of Electrical Engineering

Text book, title, author, and year

Text book

I Putu Jati Arsana, Etika Profesi Insinyur: Membangun Sikap Profesionalisme Sarjana Teknik, Penerbit: Universitas Tompotika, Luwuk.

Other supplemental materials

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Optional references

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Specific course information

Brief description of the content of the course (catalogue description)

This lecture provides knowledge about ethics concept, profession and professional, engineer and code of ethics, ethical problem solving techniques, risk, work safety and health, engineer rights and obligations, engineer profession code of ethics, the case study of the application of the engineer profession code of ethics.

Pre-requisites or co-requisites

HKU 110, HKU 120

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain profession, professionalism, engineer and professional ethics concepts
- ii. Explain ethical concepts based on any perspective.
- iii. Explain and use the techniques to solve ethical problems

- iv. Explain the relationship between risk, safety and accident with professional ethics in engineering profession activities.
 - v. Explain the rights and obligations of engineer profession
 - vi. Explain ethical concept in research and experiment
 - vii. Explain and analyze the code of ethics of engineer profession in the real case.
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain profession, professionalism, engineer and professional ethics concepts	4
ii.	Ability to explain ethical concepts based on any perspective.	4
iii.	Ability to explain and use the techniques to solve ethical problems	4
iv.	Ability to explain the relationship between risk, safety and accident with professional ethics in engineering profession activities.	4
v.	Ability to explain the rights and obligations of engineer profession	4
vi.	Ability to explain ethical concept in research and experiment	4
vii.	Ability to explain and analyze the code of ethics of engineer profession in the real case	4

Brief list of topics to be covered

- i. Introduction to profession ethics
- ii. Ethics, profession and professionalism, engineer, and the code of ethics of engineer profession.
- iii. Understanding of ethics Diagram of Electrical Industry.
- iv. The techniques to solve ethical problem
- v. Risk, safety and accident
- vi. Engineer rights and obligations
- vii. The ethics of research and experiment
- viii. The code of ethics of engineer profession
- ix. Presentation of case study

TIN 202
Human Resources Management

Course number and name

TIN 202: Human Resources Management

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Wisnel, Prima Fithri, Lecturers of Industrial Engineering

Course coordinator: Prima Fithri, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Dessler, Gary. ***Human Resource Management***. 10th Ed. Prentice Hall. 2005

Other supplemental materials

Mathis, Robert L. & John H. Jackson. ***Human Resource Management***. 10th Ed. Thomson-SouthWestern.2004

Specific course information

Brief description of the content of the course (catalogue description)

This course discuss basic concept of human resources management. Students learn the steps of human resources management, such as: introduction to human resources management, the strategic role of human resources management, job analysis, personnel planning, recruitment process, employee interview, employee training and development, establishing salary, bonus, and incentive for employee. Students also are introduced to the examples of real cases in conducting human resources management generally and at certain company. Students are expected to do the job related to human resources management by applying the topics discussed in the course.

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the basic concept of human resources management (HRM)
- ii. Explain the importance of applying integrated and planned human resources management well to achieve organizational goals effectively and efficiently

- iii. Explain the procedure how to pay salary, incentive, bonus and other facilities to the employee
 - iv. Apply the human resources management today
 - v. Apply the human resources management at small enterprises and entrepreneurial firms
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 3, 4, 7

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the basic concept of human resources management (HRM)	1, 3
ii.	Ability to explain the importance of applying integrated and planned human resources management well to achieve organizational goals effectively and efficiently	1, 3
iii.	Ability to explain the procedure how to pay salary, incentive, bonus and other facilities to the employee	1, 3, 4
iv.	Ability to apply the human resources management today	4, 7
v.	Ability to apply the human resources management at small enterprises and entrepreneurial firms	7

Brief list of topics to be covered

- i. Introduction to human resources management
- ii. Human resource management strategy and analysis
- iii. Job analysis and the talent management process
- iv. Personnel planning and recruiting
- v. Employee testing and selection
- vi. Interviewing candidates
- vii. Training and developing employee
- viii. Performance management and appraisal
- ix. Employee retention, engagement and careers
- x. Establishing strategic pay plans
- xi. Pay for performance and financial incentives
- xii. Benefits and services
- xiii. Managing global human resources
- xiv. Managing human resources in small and entrepreneurial firms

TIN 204
Multivariate Calculus

Course number and name

TIN 204: Multivariate Calculus

Credits and contact hours

4 Credit Hours (200 minutes per week)

Instructor's or course coordinator's name

Instructor: Effendi, Efendi, Admi Nazra, Lecturers of Department of Mathematics

Course coordinator: Effendi, Senior Lecturer of Mathematics Department

Text book, title, author, and year

Text book

Advanced Engineering Mathematics, 10th ed., Kreyzig, Erwin; H. Kreyzig; E. J. Norminton, John Wiley & Sons, 2011

Calculus Volume II, Apostol, Anton M., 2nd ed., John Wiley & Sons, 1969.

Other supplemental materials

Advanced Calculus, Rev ed., Loomis, L. H. And S. Stenberg, Jones and Bartlett Pub., 1990

Calculus In 3d, Nitecki, Z. H., Tufts University, 2012

Optional references

Specific course information

Brief description of the content of the course (catalogue description)

Introduction to Multivariate Calculus, Taylor series, power series, scalar and vector function, scalar and vector function differentiation, double and triple integral, line and surface integral.

Pre-requisites or co-requisites

PAM 112

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the scope of multivariate calculus
- ii. Explain and calculate the Taylor and MacLaurin series
- iii. Calculate maximum and minimum value using by Taylor and MacLaurin series
- iv. Explain and calculate operation of vectors
- v. Explain and calculate differentiation of vector function

- vi. Explain and calculate double integral
 - vii. Explain and calculate triple integral
 - viii. Explain and calculate line integral
 - ix. Explain and calculate surface integral
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the scope of multivariate calculus	1
ii.	Ability to explain and calculate the Taylor and MacLaurin series	1
iii.	Ability to calculate maximum and minimum value using by Taylor and MacLaurin series	1
iv.	Ability to explain and calculate operation of vectors	1
v.	Ability to explain and calculate differentiation of vector function	1
vi.	Ability to explain and calculate double integral	1
vii.	Ability to explain and calculate triple integral	1
viii.	Ability to explain and calculate line integral	1
ix.	Ability to explain and calculate surface integral	1

Brief list of topics to be covered

- i. Introduction to Multivariate Calculus
- ii. Taylor and Power Series
- iii. Vector
- iv. Differential of Vector Function
- v. Double and Triple Integral
- vi. Line and Surface Integral.

TIN 206
Operation Research I

Course number and name

TIN 206: Operation Research I

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Eri Wirdianto, Elita Amrina, Difana Meilani, Feri Afrinaldi, Lecturers of Industrial Engineering

Course coordinator: Eri Wirdianto, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Bazaraa, M.S., Jarvis, J.J., Sherali, H.D. (2009). Linear Programming and Network Flows, 4th Edition. Wiley.

Hillier, F.S., Lieberman, G.J. (2012). Introduction to Operations Research. McGraw Hill

Other supplemental materials

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Specific course information

Brief description of the content of the course (catalogue description)

Operational Research is a problem solving tools that must be posed by a student of Industrial Engineering. This course provides the ability the students in formulating real problems into linear programming models, using simplex algorithm and its variations in exploring the solution of linear programming and using the solution in making decision.

Pre-requisites or co-requisites

TIN 101, PAM 213

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the structures and assumptions of linear programming problems
- ii. Solve simple linear programming problems using graph method
- iii. Formulate the linear programming model of the real problem and solve it using certain software

- iv. Solve linear programming problems using simplex algorithm
 - v. Solve linear programming problems (if no initial feasible solution) using 2-phase and big M methods simplex algorithm
 - vi. Solve linear programming problems with bounded variables using simplex algorithm for bounded variables
 - vii. Formulate dual form of a linear programming model
 - viii. Explain the interpretation of dual variables
 - ix. Solve linear programming problems using dual simplex algorithm
 - x. Conduct sensitivity analysis of the linear programming problem
 - xi. Use network simplex algorithm to solve specific linear programming problems (transshipment, transportation, and assignment problems)
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i	Ability to explain the structures and assumptions of linear programming problems	1
ii	Ability to solve simple linear programming problems using graph method	1, 2
iii	Ability to formulate the linear programming model of the real problem and solve it using certain software	1, 2
iv	Ability to solve linear programming problems using simplex algorithm	1, 2
v	Ability to solve linear programming problems (if no initial feasible solution) using 2-phase and big M methods simplex algorithm	1, 2
vi	Ability to solve linear programming problems with bounded variables using simplex algorithm for bounded variables	1, 2
vii	Ability to formulate dual form of a linear programming model	1, 2
viii	Ability to explain the interpretation of dual variables	1, 2
ix	Ability to solve linear programming problems using dual simplex algorithm	1, 2
x	Ability to conduct sensitivity analysis of the linear programming problem	1, 2

xi	Ability to use network simplex algorithm to solve specific linear programming problems (transshipment, transportation, and assignment problems)	1, 2
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Brief list of topics to be covered

- i. The linear programming problem
- ii. Linear programming modeling: examples and solver Control charts for variables
- iii. The simplex method
- iv. The duality theorem and sensitivity analysis
- v. The network simplex method

TIN 208
Industrial Statistics II

Course number and name

TIN 208: Industrial Statistics II

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Eri Wirdianto, Feri Afrinaldi, Alexie Herryandie BA, Difana Meilani, Lecturers of Industrial Engineering

Course coordinator: Eri Wirdianto, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Applied Statistics and Probability for Engineers, Douglas C. Montgomery, George C. Runger, 6th edition, 2013

Other supplemental materials

(Optional references)

Statistics for Engineering and the Sciences, Mendenhall, W., Sincich, T., Prentice Hall, New Jersey, 2007.

Probability and Statistics for Engineers & Scientists, Walpole, R.E., Myers, R.H., Myers, S.L., and Ye, K., Prentice-Hall, New Jersey, 2006.

Specific course information

Brief description of the content of the course (catalogue description)

In this course students learn introduction to inferential statistics, estimation and hypothesis testing, simple linear regression, multiple linear regression, correlation and regression analysis, and non-parametric statistics

Pre-requisites or co-requisites

TIN 205

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the concepts of statistical estimation, point estimator and interval estimator (comprehension)

- ii. Solve estimation problems involving one or two samples (application)
 - iii. Explain the concepts of hypothesis testing: null hypothesis, alternative hypothesis, rejection region, significance level (p-value), type I error (comprehension)
 - iv. Solve hypothesis testing problems involving one or two samples (application)
 - v. Distinguish the concepts of simple and multiple linear regression (comprehension)
 - vi. Use the Least Squares Estimators, Estimators of variance, Assessing the utility of the model, the coefficient of correlation and determination for estimation and prediction (application)
 - vii. Use some statistical test that do not require the normally assumptions (non-parametric statistics) (comprehension)
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*
 Course addresses/ supports ABET Student Outcome(s): 1, 2, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the concepts of statistical estimation, point estimator and interval estimator (comprehension)	1
ii.	Ability to solve estimation problems involving one or two samples (application)	1, 6
iii.	Ability to explain the concepts of hypothesis testing: null hypothesis, alternative hypothesis, rejection region, significance level (p-value), type I error (comprehension)	1, 6
iv.	Ability to solve hypothesis testing problems involving one or two samples (application)	1, 6
v.	Ability to distinguish the concepts of simple and multiple linear regression (comprehension)	1, 2, 6
vi.	Ability to use the Least Squares Estimators, Estimators of variance, Assessing the utility of the model, the coefficient of correlation and determination for estimation and prediction (application)	1, 2, 6
vii.	Ability to use some statistical test that do not require the normally assumptions (non-parametric statistics) (comprehension)	1, 2, 6

Brief list of topics to be covered

- i. Introduction to inferential statistics
- ii. Estimation

- iii. Hypothesis testing
- iv. Simple linear regression
- v. Multiply linear regression
- vi. Non-parametric statistics

TIN 212
Cost Estimation and Analysis

Course number and name

TIN 212: Cost Estimation and Analysis

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Alizar Hasan, Afri Adnan, Lecturers of Industrial Engineering

Course coordinator: Alizar Hasan, Professor of Industrial Engineering

Text book, title, author, and year

Text book

Hansen, Mowen, Guan (2009). Cost Management Accounting and Control 6th Edition. Cengage Learning products are represented in Canada by Nelson Education, Ltd

Other supplemental materials

Blocher, Chen, Lin, 2000, Manajemen Biaya: Dengan Tekanan Stratejik, Jilid 1 dan 2, Salemba Empat, Jakarta, ISBN 979-8190-91-2

Matz, A., Uzry, M.F., & Hammer L.H, 1984, Cost Accounting: Planning and Control, South Westren Publishing Co., Cincinnati

(Optional references)

Specific course information

Brief description of the content of the course (catalogue description)

This course introduces the cost management concept, basic accounting (transaction, journal and ledger), cost behavior (direct and indirect costs, fixed and variable costs), job order costing, process costing, activity based costing, cost of goods manufactured, standard cost, cost control, financial report (balance sheet, income statement) and financial ratios.

Pre-requisites or co-requisites

TIN 101, TIN 108

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

This course is aimed to let students understand about cost management and be able to design a strategic of cost management of a company in order to solve the problems in the industrial engineering field.

a. *Specific outcomes of instruction*

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

- i. Explain the theory, basic concept and scope of cost accounting
 - ii. Explain charges process
 - iii. Solve industrial engineering problems by describing basic cost behavior and measure cost changes based on activity changes.
 - iv. Solve industrial engineering problems by using activity based costing system
 - v. Solve industrial engineering problems by using job order costing system
 - vi. Solve industrial engineering problems by calculating cost of products manufactured by using job order costing and process Costing
 - vii. Solve industrial engineering problems by using standard cost
 - viii. Solve industrial engineering problems by analyzing cost variance
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i	Ability to explain the theory, basic concept and scope of cost accounting	1, 4
ii	Ability to explain charges process	1
iii	Ability to solve industrial engineering problems by describing basic cost behavior and measure cost changes based on activity changes.	1, 2, 4
iv	Ability to solve industrial engineering problems by using activity based costing system	1, 2, 4
v	Ability to solve industrial engineering problems by using job order costing system	1
vi	Ability to solve industrial engineering problems by calculating cost of products manufactured by using job order costing and process Costing	1, 2, 4
vii	Ability to solve industrial engineering problems by using standard cost	1, 2, 4
viii	Ability to solve industrial engineering problems by analyzing cost variance	1, 2, 4

Brief list of topics to be covered

- i. The concept, definition, and classification of cost at manufacturing company
- ii. Basic concept of cost management and behavior

- iii. Activity based costing system
- iv. Job order costing system
- v. Process costing system
- vi. Standard cost and cost variance analysis

TIN 216
Industrial Ergonomics

Course number and name

TIN 216: Industrial Ergonomics

Credits and contact hours

2 Credit Hours (100 minutes per weeks)

Instructor's or course coordinator's name

Instructor: Lusi Susanti, Hilma Raimona Zadry, Lecturers of Industrial Engineering

Course coordinator: Lusi Susanti, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Pulat, Mustafa B. (1996). Fundamentals of Industrial Ergonomics. Waveland Press, Inc.

Iridiastadi, H. and Yassierli (2014). Ergonomi Suatu Pengantar. PT. Remaja Rosdakarya Bandung.

Other supplemental materials

Bridger, R. S. (2008). Introduction to Ergonomics. Third Edition. CRC Press.

Kroemer, et al. (2000). Ergonomics: How to Design For Ease and Efficiency. Second Edition. Prentice Hall.

Kroemer and Grandjean (1997). Fitting the Task to the Human: A Text Book of Occupational Ergonomics. Fifth edition. CRC Press.

Optional references

Wilson and Corlett (2005). Evaluation of Human Work. 3rd Edition. Florida: CRC Group.

Wickens et al. (1998). An Introduction to Human Factors Engineering. Michigan: Lonman.

Specific course information

Brief description of the content of the course (catalogue description)

This course learn human factors including anthropometry, work biomechanics, work physiology, display and control, hand tools design, work environment.

Pre-requisites or co-requisites

TLI 110, TIN 207

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain why application of ergonomic principle is very important in industry

- ii. Explain the definition and goal of anthropometry
 - iii. Explain the types of anthropometry data.
 - iv. Attain skills in collecting anthropometry data and analyze it using software.
 - v. Explain the things related to physical ergonomics
 - vi. Use physical ergonomic measurement tools
 - vii. Explain the concept of human-computer interface.
 - viii. Improve performance of cognitive tasks such as human-computer interaction found in industry and the surrounding area.
 - ix. Explain the concept of human-machine system.
 - x. Explain general principles in of work area design
 - xi. Attain skills in designing a good work area
 - xii. Explain the principles of work design and method.
 - xiii. Explain the concept of work environment
 - xiv. Attains skills in measuring work environment aspects
 - xv. Explain the principles of display.
 - xvi. Attain skills in analyzing display in the surrounding area
 - xvii. Explain the principles of product design
 - xviii. Attain skills in designing ergonomic products those are jig and fixtures, sign and label.
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain why application of ergonomic principle is very important in industry	1, 2, 3
ii.	Ability to explain the definition and goal of anthropometry	1, 2, 3
iii.	Ability to explain the types of anthropometry data.	1, 2, 3
iv.	Ability to attain skills in collecting anthropometry data and analyze it using software.	1, 2, 4, 6
v.	Ability to explain the things related to physical ergonomics	1, 2, 3
vi.	Ability to use physical ergonomic measurement tools	1, 2, 6
vii.	Ability to explain the concept of human-computer interface.	1, 2, 3
viii.	Ability to improve performance of cognitive tasks such as human-computer interaction found in industry and the surrounding area.	1, 2, 4, 6
ix.	Ability to explain the concept of human-machine system.	1, 2, 3
x.	Ability to explain general principles in of work area design	1, 2, 3
xi.	Ability to attain skills in designing a good work area	1, 2, 4, 6

xii.	Ability to explain the principles of work design and method.	1, 2, 3
xiii.	Ability to explain the concept of work environment	1, 2, 3
xiv.	Ability to attains skills in measuring work environment aspects	1, 2, 4, 6
xv.	Ability to explain the principles of display.	1, 2, 3
xvi.	Ability to attain skills in analyzing display in the surrounding area	1, 2, 4, 6
xvii.	Ability to explain the principles of product design	1, 2, 3
xviii.	Ability to attain skills in designing ergonomic products those are jig and fixtures, sign and label	1, 2, 4, 6

Brief list of topics to be covered

- i. Anthropometry
- ii. Work Biomechanics
- iii. Work Physiology
- iv. Display and Control
- v. Work Environment.

TIN 218
Production Planning and Control

Course number and name

TIN 218: Production Planning and Control

Credits and contact hours

4 Credit Hours (200 minutes per week)

Instructor's or course coordinator's name

Instructor: Henmaidi, Jonrinaldi, Dicky Fatrias, Alfadhilani, Lecturers of Industrial Engineering

Course coordinator: Henmaidi, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

D. D. Bedworth, J. E. Bailey. (1987). Integrated production control system; John Wiley & Sons.

D. W. Fogarthy, J. H. Blackstone, T. R. Hoffmann. (1991). Production and inventory management; South Western Pub. Co.

R. J. Tersine. (1993). Principles of inventory and materials management; Prentice Hall.

D. Sipper, Bulfin Jr. (1997). Production planning, control, and integrations; McGraw Hill.

Other supplemental materials

S. Nahmias. (2005). Production and operations analysis, 5th Ed; McGraw Hill/IRWIN.

Narasimhan, H.W. Seetha Oden, G.A. Langewater, RA. Lucier. (1991). Handbook of material and capacity requirement planning; McGraw Hill

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

In this course students learn the role of production planning and control traditionally including: demand forecasting, aggregate production planning, disaggregation process, capacity planning and evaluation, inventory planning and control, material requirements planning, daily and weekly operations scheduling, personnel scheduling and monitoring and evaluation of production planning. Students also learn designing assembly production line. Finally, students learn concepts and principles of just in time production system, theory of constraints-optimized production technology, Project based production system, load oriented manufacturing control (LOMC) and advanced production systems such as flexible manufacturing system, supply chain manufacturing.

Pre-requisites or co-requisites

TIN 101, TIN 207

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the methodology for production planning and control
- ii. Forecast and evaluate the future demand
- iii. Conduct aggregate production planning and master production schedule (MPS)
- iv. Conduct capacity and material planning and evaluation for production planning.
- v. Arrange production and personnel scheduling and evaluate them
- vi. Design assembly production line for production and fabrication
- vii. Monitor and revise production planning based on actual production
- viii. Explain just in time production system, theory of constraints - optimized production technology, project based production system, load oriented manufacturing control and compare them
- ix. Write and present case study report about production planning

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the methodology for production planning and control	1
ii.	Ability to forecast and evaluate the future demand	1, 2
iii.	Ability to conduct aggregate production planning and master production schedule (MPS)	1, 2
iv.	Ability to conduct capacity and material planning and evaluation for production planning.	1, 2
v.	Ability to arrange production and personnel scheduling and evaluate them	1, 2
vi.	Ability to design assembly production line for production and fabrication	1, 2
vii.	Ability to monitor and revise production planning based on actual production	1, 2

viii.	Ability to explain just in time production system, theory of constraints - optimized production technology, project based production system, load oriented manufacturing control and compare them	1
ix.	Ability to write and present case study report about production planning	1

Brief list of topics to be covered

- i. Introduction to production planning and control
- ii. Role for production planning and control
- iii. Forecasting methods and evaluation
- iv. Aggregate production planning
- v. Disaggregate planning and master production schedule (MPS)
- vi. Inventory planning and control (deterministic and probabilistic models)
- vii. material requirements planning (MRP)
- viii. Capacity planning (RCCP and CRP)
- ix. Operations scheduling
- x. Personnel scheduling
- xi. Assembly line balancing
- xii. Production activity control
- xiii. Introduction to just in time production system
- xiv. Introduction to theory of constraints/ optimized production technology
- xv. Introduction to project based production system
- xvi. Introduction to load oriented manufacturing control
- xvii. Introduction to other advanced production systems (Flexible Manufacturing System, Supply Chain Manufacturing, Dynamically Integrated Manufacturing System, Make to Order, Cellular Manufacturing System, Industry 4.0)

TIN 301
Operations Research II

Course number and name

TIN 301: Operations Research II

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Elita Amrina, Feri Afrinaldi, Asmuliardi Muluk, Alexie Herryandie BA, Ahmad Syafruddin Indrapriyatnai, Lecturers of Industrial Engineering

Course coordinator: Ahmad Syafruddin Indrapriyatna, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Hillier, F.S. and Lieberman, G.J., 2012. Introduction To Mathematical Programming, 9th ed., McGraw-Hill Publishing Co

Other supplemental materials

Taha, H.A., 1997. Operations Research: An Introduction, 6th ed. Prentice Hall Inc
(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

This course learn network analysis, dynamic programming, markov chain and decision process, game theory, decision theory, queuing theory

Pre-requisites or co-requisites

TIN 205, TIN 206

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the scope of operations research II
- ii. Calculate and select the network using shortest path method
- iii. Calculate and select the network using minimum spanning tree
- iv. Calculate and select the network using maximum flow criteria
- v. Analyse and select an optimal solution by using dynamic programming

- vi. Apply Markov process to predict the future occurrences and movement of this variable by the use of presently known probabilities for limited and unlimited stage
 - vii. Apply multiple queuing models to solve queuing problems
 - viii. Calculate and select an optimal strategy using game theory
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the scope of operations research II	1, 2
ii.	Ability to calculate and select the network using shortest path method	1, 2, 4
iii.	Ability to calculate and select the network using minimum spanning tree	1, 2, 4
iv.	Ability to calculate and select the network using maximum flow criteria	1, 2, 4
v.	Ability to analyse and select an optimal solution by using dynamic programming	1, 2, 4
vi.	Ability to apply Markov process to predict the future occurrences and movement of this variable by the use of presently known probabilities for limited and unlimited stage	1, 2, 4
vii.	Ability to apply multiple queuing models to solve queuing problems	1, 2, 4
viii.	Ability to calculate and select an optimal strategy using game theory	1, 2, 4

Brief list of topics to be covered

- i. Networks analysis with shortest path criteria
- ii. Network analysis with minimum spanning tree criteria
- iii. Network analysis with minimum flow criteria
- iv. Dynamic programming
- v. Markov chain
- vi. Queuing theory
- vii. Game theory

TIN 303
Management Information Systems

Course number and name

TIN 303: Management Information Systems

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Ikhwan Arief, Asmuliardi Muluk, Difana Meilani, Lecturers of Industrial Engineering

Course coordinator: Difana Meilani, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Management Information Systems 10th Edition, Raymond McLeod and George Schell, 2008.

Other supplemental materials

Management Information Systems – New Approach to Organization and Technology – 12th Edition, Kenneth C. Laudon & Jane P. Laudon, 2011.

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

In this course students learn how to use information technology to get competitive advantages for the company or personal or organization. It discuss about definition of the information and the things are related to it such as planning, design, and implementation of information system, computer hardware and software, the elements of computer system and introduction to methodology of information system in order to help the decision making.

Pre-requisites or co-requisites

TIN 104

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the concept of management information system
- ii. Explain the basic concept of information system
- iii. Explain the basic concept of information system for the competitive advantages
- iv. Explain the basic concept of information technology for electronic trades.

- v. Explain the basic concept of information system for users and system developers.
 - vi. Explain the information resources those are computation and communication resources
 - vii. Explain the information resources that is data base management system
 - viii. Explain the information resources that is system developers
 - ix. Explain the information resources that is information in practices
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/supports ABET Student Outcome(s): 2, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the concept of management information system	4
ii.	Ability to explain the basic concept of information system	4
iii.	Ability to explain the basic concept of information system for the competitive advantages	4
iv.	Ability to explain the basic concept of information technology for electronic trades.	4
v.	Ability to explain the basic concept of information system for users and system developers.	4
vi.	Ability to explain the information resources those are computation and communication resources	4
vii.	Ability to explain the information resources that is data base management system	2
viii.	Ability to explain the information resources that is system developers	2
ix.	Ability to explain the information resources that is information in practices	4

Brief list of topics to be covered

- i. Introduction to management information system
- ii. Information system for the competitive advantages
- iii. The use of information technology in E-commerce
- iv. The users and information system developers
- v. Computer and communication resources
- vi. Data base and data base management system
- vii. The information system developers
- viii. The information system resources

ix. The information system based decision making

TIN 309
Automation of Production System

Course number and name

TIN 309: Automation of Production System

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Alfadhlani, Desto Jumeno, Asmuliardi Muluk, Lecturers of Industrial Engineering

Course coordinator: Alfadhlani, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Computer Aided Manufacturing, T-C Chang, R. Wysk, and H-P Wang. Prentice Hall, 1998

Industrial Electronics, Petruzella, F.D., McGraw-Hill, Singapore, 1996.

Other supplemental materials

Automation, Production Systems and Computer Integrated Manufacturing, M.P. Groover, Pearson Education.

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

This course discuss principles, basic concepts and development of automation system, electrical circuit, digital logic control, data communication system and numerical control basic programming (NC). At the end of this course, students are expected to be able to design simple automated production system.

Pre-requisites or co-requisites

TIN 104, TIN 218

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the principles of automation design.
- ii. Explain Industry 4.0
- iii. Explain and demonstrate basic electronic circuit.
- iv. Explain and demonstrate electronic circuit and logical gate

- v. Determine and demonstrate the use of industrial control tools
- vi. Explain and demonstrate basic data communication in manufacturing system
- vii. Explain the function and components of the programmable logic control (PLC) and write PLC programming code.
- viii. Explain the fundamental of numerical control (NC) and write NC programming code.
- ix. Explain and demonstrate the basic concept of rapid prototyping
- x. Explain the basic concept of robotics
- xi. Explain the basic concept of computer integrated manufacturing (CIM)
- xii. Design the simple automation production system.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the principles of automation design.	4
ii.	Ability to explain Industry 4.0	4
iii.	Ability to explain and demonstrate basic electronic circuit.	6
iv.	Ability to explain and demonstrate electronic circuit and logical gate	6
v.	Ability to determine and demonstrate the use of industrial control tools	6
vi.	Ability to explain and demonstrate basic data communication in manufacturing system	6
vii.	Ability to explain the function and components of the programmable logic control (PLC) and write PLC programming code.	1, 2, 6
viii.	Ability to explain the fundamental of numerical control (NC) and write NC programming code.	1, 2, 6
ix.	Ability to explain and demonstrate the basic concept of rapid prototyping	4, 6
x.	Ability to explain the basic concept of robotics	4
xi.	Ability to explain the basic concept of computer integrated manufacturing (CIM)	4
xii.	Ability to design the simple automation production system	1, 2, 3, 6

Brief list of topics to be covered

- i. Introduction to automation system
- ii. Principles of automation of production system
- iii. Industry 4.0

- iv. Electrical diagram
- v. Numbering system, boolean algebra, basic logical gate
- vi. Primary and pilot control devices
- vii. Close control system
- viii. Data communication
- ix. Programmable Logic Control (PLC)
 - x. Numerical Control (NC)
 - xi. Rapid prototyping
- xii. Robotics
- xiii. Flexible manufacturing system (FMS)
- xiv. Computer Integrated Manufacturing (CIM)

TIN 311
Organizational Behaviour and Design

Course number and name

TIN 311: Organizational Behaviour and Design

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Alizar Hasan, Prima Fithri, Asmuliardi Muluk, Lecturers of Industrial Engineering

Course coordinator: Alizar Hasan, Professor of Industrial Engineering

Text book, title, author, and year

Text book

V.g. Kondalkar (2007), Organizational Behaviour New Age International (P) Ltd., Publishers. New Delhi.

Ronald J. Recardo (2008). Organization Design a Practical methodology and Toolkit HRD Press, Inc. Amherst. Massachusetts.

Other supplemental materials

Naomi Stanford (2007) Guide to Organization Design Creating high-performing and adaptable Enterprises Published by Profile Books Ltd, Exmouth House, Pine Street, London EC1R 0JH

Specific course information

Brief description of the content of the course (catalog description)

This course discuss about learning personal, group and organizational impacts to organizational behavior and applying that knowledge in designing and improving the effectiveness of an organization.

Pre-requisites or co-requisites

TIN 202

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the relationship of personal, group, organizational behavior in achieving an effective organization
- ii. Explain the behavior model for efficient organization and the components of organization needed to manage

- iii. Explain the management approaches and classical management theory
- iv. Understand fundamental personal and group behaviors, types of attitudes, determinant factors of job satisfaction and their effects to the performance of the organization and the commitment of the organization
- v. Understand conflict management and stress, communication, leadership, culture, organizational climate, and the types of organization.
- vi. Explain and understand organizational design, and use the methodology and approach models to design the effective organization.

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 4, 5

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the relationship of personal, group, organizational behavior in achieving an effective organization	1, 2, 5
ii.	Ability to explain the behavior model for efficient organization and the components of organization needed to manage	1, 2, 5
iii.	Ability to explain the management approaches and classical management theory	1, 2, 5
iv.	Ability to understand fundamental personal and group behaviors, types of attitudes, determinant factors of job satisfaction and their effects to the performance of the organization and the commitment of the organization	1, 2, 5
v.	Ability to understand conflict management and stress, communication, leadership, culture, organizational climate, and the types of organization.	1, 2, 4, 5
vi.	Ability to explain and understand organizational design, and use the methodology and approach models to design the effective organization	1, 2, 4, 5

Brief list of topics to be covered

- i. Introduction, definition, and disciplines contributing to organizational behaviour
- ii. Introduction and approaches for classical management theory
- iii. Individual dimension and organizational behavior
- iv. Group dimension in organizational behavior
- v. Dynamic organization
- vi. Models, approaches and the design of organization

TIN 313
Safety, Health and Work Environment

Course number and name

TIN 313: Safety, Health and Work Environment

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Nilda Tri Putri, Hilma Raimona Zadry, Prima Fithri, Lecturers of Industrial Engineering

Course coordinator: Nilda Tri Putri, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Dr. Sumakmur, P.K. M.Sc. "Keselamatan Kerja dan Pencegahan Kecelakaan", Jakarta, 1981

Other supplemental materials

Benjamin O. Alli. "Fundamental Principles of Occupational Health and Safety. Second Edition. International Labour Office. Geneva. 2008.

Illinois Onsite Safety & Health Consultation Program, The Department of Commerce & Community Affairs, Industrial Services Division. Managing Worker Safety and Health. Chicago, Illinois

Specific course information

Brief description of the content of the course (catalogue description)

This course will explore the health and safety issues of various types of work. Students will gain an understanding of the current state of occupational safety and health in industry and globally including the enforcement of laws regulating occupational safety and health and the roles of workers, unions, and employers. The historical, economic, ergonomics and cultural forces contributing to and inhibiting solutions to occupational safety and health problems will be analyzed.

Pre-requisites or co-requisites

TLI 110, TIN 216

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Know, understand, explain and implement theory, concept and principles of safety, health and work environment in order to increase health degree of the employee
 - ii. Understand and act according to work health and safety (K3), understand the law of K3, hazard risk in workplace, self protection equipment, the prevention of work accident, toxic and dangerous materials and their handling, safety and health management system and ergonomics to improve work productivity
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 3, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to know, understand, explain and implement theory, concept and principles of safety, health and work environment in order to increase the health level of the employees	1, 3, 4
ii.	Ability to understand and act according to work health and safety (K3), understand the law of K3, hazard risk in workplace, self protection equipment, the prevention of work accident, toxic and dangerous materials and their handling, safety and health management system and ergonomics to improve work productivity	1, 3, 4

Brief list of topics to be covered

- i. The definition of work safety and health according to the Occupational Safety and Health Act.
- ii. Types of work hazard and accident.
- iii. Work accident prevention and investigation.
- iv. Effective safety performance measurement.
- v. Occupational health risk management.
- vi. Ergonomics for work safety and health.
- vii. Management and control of human factors and behavior-related safety.
- viii. Improving safety culture.
- ix. Occupational safety and health management system

TIN 315
Industrial Engineering Design I

Course number and name

TIN 315: Industrial Engineering Design I

Credits and contact hours

2 Credit Hours (100 minutes per week of lab work)

Instructor's or course coordinator's name

Instructor: Henmaidi, Alfadhilani, Jonrinaldi, Lusi Susanti, Hilma Raimona Zadry, Desto Jumeno, Reinny Patrisina, Nilda Tri Putri, Dicky Fatrias, Lecturers of Industrial Engineering

Course coordinator: Reinny Patrisina, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Barnes, R.M. 1980. Motion and Time Study, Design and Measurement of Work. 7th Edition, New York: John Wiley & Sons.

Biegel, J.E (1963). Production Control: A Quantitative Approach. Prentice – Hall

Fogarty, D.W. (1991). Production and Inventory Management 2 nd edition. Ohio: South-Western Publishing Co.

Nurmianto, E. (1996). Ergonomi: Konsep Dasar dan Aplikasinya. Surabaya: PrimaPrinting. ISBN: 979-545-007-7.

Suma'mur, P.K. (1982). Keselamatan Kerja dan Pencegahan Kecelakaan. Jakarta: PT.Saksama.

Sutalaksana, I.Z., Anggawisastra, R. & Tjakraatmadja, J.H. (2006). Teknik Perancangan Sistem Kerja. Bandung: Jurusan Teknik Industri ITB.

Wignjosebroto, S., 2008. Ergonomi Studi Gerak dan Waktu. Teknik Analisis untuk Peningkatan Produktivitas Kerja. Edisi Pertama, Cetakan Keempat. Penerbit Guna Widya.

Other supplemental materials

Niebel, 2001. Methods, Standards, and Work Design. Tenth Edition. New York: McGraw Hill.

Freivalds, A., 2009. Niebel's Methods, Standards, and Work Design. 12th Edition. McGraw Hill International Edition

(Optional references)

Specific course information

Brief description of the content of the course (catalogue description)

This course is a laboratory works. This course is delivered at work system design and ergonomics and production system laboratories. These lab activities focus on learning the aspects needed in designing optimal work system and capacity and material planning of the production planning.

Pre-requisites or co-requisites

TIN 216, TIN 218

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Measure human body dimension used to optimize work system
- ii. Measure physiological workload used for designing work system
- iii. Apply the direct working time measurement to design work system
- iv. Apply the concept of ergonomics and anthropometry to design optimal work system
- v. Solve the assembly line balancing problem in the shop floor
- vi. Conduct the production planning based on historical demand
- vii. Describe and explain the steps to apply rough cut capacity planning, material requirement planning and capacity requirement planning

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Measure human body dimension used to optimize work system	1
ii.	Measure physiological workload used for designing work system	1, 2, 3, 6
iii.	Apply the direct working time measurement to design work system	1, 2, 6
iv.	Apply the concept of ergonomics and anthropometry to design optimal work system	1, 2, 3, 6
v.	Solve the assembly line balancing problem in the shop floor	1, 2
vi.	Conduct the production planning based on historical demand	1, 2
vii.	Describe and explain the steps to apply rough cut capacity planning, material requirement planning and capacity requirement planning	1, 2, 4

Brief list of topics to be covered

- i. Ergonomics anthropometry
- ii. Work time measurement
- iii. Work system design
- v. Production line balancing

- vi. Production planning
- vii. Capacity and material requirements planning of the production

TIN 317
Introduction to Energy

Course number and name

TIN 317: Introduction to Energy

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Taufik, Lecturer of Industrial Engineering

Course Coordinator: Taufik, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Reynolds, W C., Perkins, H C., Engineering Thermodynamics 2nd Edition, McGraw-Hill Companies; 2 edition (May 1, 1977)

Kreith, F., Manglik R. M., Bohn M. S, Principles of Heat Transfer, CL Engineering; 7 edition (June 10, 2010)

Other supplementary materials

Arismunandar W., Motor Bakar, UI Press, Jakarta, 1988.

Arismunandar W., Penggerak mula turbin, Penerbit ITB, Bandung, 1982.

Specific course information

Brief description of the content of the course (catalogue description)

General description of energy and types of energy, Basic concepts, definition, term used and thermodynamics application in daily life, properties of pure substances, thermodynamics 1st law, basic concepts of heat transfer mechanism.

Pre-requisites or co-requisites

PAP 114

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Identify and use units and notations in thermodynamics.
- ii. State and illustrate the first law of thermodynamics.
- iii. Identify and explain the concepts of enthalpy, and specific energy.

- iv. Apply the first law of thermodynamics to formulate and solve engineering problems for closed systems, open systems under steady-state, and power cycles.
 - v. Use thermodynamic tables, charts, and equation of state (e.g. the ideal gas law) to obtain appropriate property data to solve thermodynamics problems.
 - vi. Identify the important and/or possible heat transfer modes in any physical system.
 - vii. Represent any steady-state, 1-D conduction system as a thermal circuit and solve for unknown heat rates or temperatures.
 - viii. Learn to classify different types of internal combustion engines and their applications.
 - ix. List and explain the characteristics and performance of turbine systems.
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to identify and use units and notations in thermodynamics	1
ii.	Ability to state and illustrate the first law of thermodynamics	1, 4
iii.	Ability to identify and explain the concepts of enthalpy, and specific energy.	1
iv.	Ability to apply the first law of thermodynamics to formulate and solve engineering problems for closed systems, open systems under steady-state, and power cycles.	1, 4
v.	Ability to use thermodynamic tables, charts, and equation of state (e.g. the ideal gas law) to obtain appropriate property data to solve thermodynamics problems.	1
vi.	Ability to identify the important and/or possible heat transfer modes in any physical system	1, 4
vii.	Ability to represent any steady-state, 1-D conduction system as a thermal circuit and solve for unknown heat rates or temperatures.	1
viii.	Ability to learn to classify different types of internal combustion engines and their applications.	1, 4
ix.	Ability to list and explain the characteristics and performance of turbine systems.	1, 4

Brief list of topics to be covered

- i. Concept of Energy, unit, and notation in thermodynamics

- ii. The first law of thermodynamics
- iii. Properties of pure substances
- iv. Control mass and control volume analysis
- v. Introduction to heat transfer modes
- vi. 1-D conduction system
- vii. Internal Combustion Engine
- viii. Turbine systems

TIN 319
Project Management

Course number and name

TIN 319: Project Management

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Insannul Kamil, Dicky Fatrias, Lecturers of Industrial Engineering

Course coordinator: Insannul Kamil, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Project Management: A systems approach to planning, scheduling, and controlling. Eight Edition,

Kerzner, H. John Wiley & Sons, Inc. (2003).

Other supplemental materials

Manajemen Proyek, Santosa, Budi, Guna Widya, Edisi 1 cetakan 2. (1997).

Optional references

Specific course information

Brief description of the content of the course (catalogue description)

This course provides knowledge about project planning, management and control, in accordance with management principles in general. The stages of project planning take a considerable portion of the discussion because it includes many important sub-topics, including defining work packages (WP) and drafting WP into work breakdown structure (WBS), WP scheduling into Gantt Charts, network diagram making, budgeting, the determination of the critical path and application of the crashing procedure. Furthermore, the project control phase discuss techniques for measuring project work progress, and WP performance index.

Pre-requisites or co-requisites

TIN 218

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the definition of project, project life cycle, and project management

- ii. Work in team to solve project problems given
 - iii. Define work package (WP) and convert into work breakdown structure (WBS)
 - iv. Arrange the project schedule using Gantt chart and critical path method (CPM)
 - v. Apply crashing procedure to shorten project duration time.
 - vi. Select the appropriate location method to schedule limited resources
 - vii. Use engineering cost techniques in estimating project cost
 - viii. Measure work package performance index
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4, 5

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the definition of project, project life cycle, and project management	1, 2, 3
ii.	Ability to work in team to solve project problems given	1, 2, 3, 4, 5
iii.	Ability to define work package (WP) and convert into work breakdown structure (WBS)	1, 2, 3
iv.	Ability to arrange the project schedule using Gantt chart and critical path method (CPM)	1, 2
v.	Ability to apply crashing procedure to shorten project duration time.	1, 2, 4
vi.	Ability to select the appropriate location method to schedule limited resources	1, 2, 4
vii.	Ability to use engineering cost techniques in estimating project cost	1, 2, 4
viii.	Ability to measure work package performance index	1, 2, 4

Brief list of topics to be covered

- i. Definition and life cycle of the project
- ii. Project planning
- iii. Project scheduling
- iv. Crashing procedure to shorten project duration time
- v. Project considering limited time and resources
- vi. Program evaluation and review techniques (PERT)
- vii. Estimating project duration and cost
- viii. Critical chain project management
- ix. Project controlling

TIN 302
Engineering Economics

Course number and name

TIN 302: Engineering Economics

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Bakri Bakar, Feri Afrinaldi, Desto Jumeno, Lecturers of Industrial Engineering

Course coordinator: Feri Afrinaldi, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Newnan, D.G., T.G. Eschenbach, and J.P. Lavelle (2011). Engineering Economic Analysis, (12th ed.), Oxford University Press, Oxford.

Other supplement material

Principles of Engineering Economy, Eugene L. Grant, W. Grant Ireson, Richard S. Leavenworth, 8th Edition, 1990.

Specific course information

Brief description of the content of the course (catalog description)

This course discusses theory and application of decision making considering economic aspect in engineering, business and personal context. In decision making, there are some alternative solutions considered and evaluated. This course also discusses break even point, depreciation, and inflation.

Pre-requisites or co-requisites

TIN 212

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

At the end of this course, each student is expected to be able to:

- i. Explain the concept of decision making considering economic aspect and cost concept in engineering area
- ii. Explain the concept of engineering cost, conduct cost estimation, and make cash flow diagram
- iii. Calculate nominal interest, effective interest, and continuous compounding

- iv. Calculate the value of uniform series of a cash flow
 - v. Calculate the value of gradient series of a cash flow
 - vi. Take economic decision making using present worth analysis
 - vii. Take economic decision making using annual cash flow analysis
 - viii. Take economic decision making using rate of return analysis
 - ix. Take economic decision making using incremental rate of return evaluation
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 3, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the concept of decision making considering economic aspect and cost concept in engineering area	1, 3
ii	Ability to explain the concept of engineering cost, conduct cost estimation, and make cash flow diagram	1, 3
iii	Ability to calculate nominal interest, effective interest, and continuous compounding	1, 4
iv	Ability to calculate the value of uniform series of a cash flow	1, 4
v	Ability to calculate the value of gradient series of a cash flow	1, 4
vi	Ability to take economic decision making using present worth analysis	1, 4
vii	Ability to take economic decision making using annual cash flow analysis	1, 4
viii	Ability to take economic decision making using rate of return analysis	1, 4
ix	Ability to take economic decision making using incremental rate of return evaluation	1, 4

Brief list of topics to be covered

- i. Decision making considering economic aspect and professional ethics
- ii. Cost concept, cost estimation, cash flow diagram, interest, nominal interest, effective interest, continuous compounding
- iii. Uniform series
- iv. Gradient series
- v. Present Worth Analysis
- vi. Annual cash flow Analysis
- vii. Rate of Return Analysis
- viii. Incremental rate of return evaluation
- ix. Multiple rate of return
- x. Future worth analysis

- xi. Benefit cost ratio analysis
- xii. Payback period analysis
- xiii. Depreciation
- xiv.** After tax cash flow

TIN 304
Quality Control and Assurance

Course number and name

TIN 304: Quality Control and Assurance

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Nilda Tri Putri, Feri Afrinaldi, Eri Wirdianto, Prima Fithri, Lecturers of Industrial Engineering

Course coordinator: Nilda Tri Putri, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Wadsworth, H.M., Stephens, K.S., Godfrey, A.B. (2002). Modern Methods For Quality Control and Improvement, 2nd Edition. Wiley.

Besterfield, D.H. (2009). Quality Control, 8th Edition. Pearson.

Other supplemental material

Introduction to Statistical Quality Control, 6th Edition by Douglas C. Montgomery, 2008, John Wiley & Sons, Inc., New York

Specific course information

Brief description of the content of the course (catalog description)

This course aims to provide the ability of students to use statistical techniques in quality control, such as quality control charts and acceptance sampling. This course also introduces the concepts of quality assurance, quality management and quality costs.

Pre-requisites or co-requisites

TIN 208

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

At the end of this course, each student is expected to be able to:

- i. Explain the definition of quality, quality management, quality costs
- ii. Apply statistical concepts in modeling quality of a process
- iii. Draw and use variables control charts
- iv. Draw and use attributes control charts

- v. Design and use acceptance sampling for attributes
 - vi. Design and use acceptance sampling for variables
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the definition of quality, quality management, quality costs	1, 2, 3, 4
ii	Ability to apply statistical concepts in modeling quality of a process	1, 2
iii	Ability to draw and use variables control charts	1, 2
iv	Ability to draw and use attributes control charts	1, 2
v	Ability to design and use acceptance sampling for attributes	1, 2
vi	Ability to design and use acceptance sampling for variables	1, 2

Brief list of topics to be covered

- i. Quality Improvement in the Modern Business Environment
- ii. Modeling Process Quality
- iii. Control charts for variables
- iv. Control charts for attributes
- v. Sampling plan for attributes
- vi. Sampling plan for variables

TIN 306 System Modelling

Course number and name

TIN 306: System Modelling

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Ahmad Syafruddin, Jonrinaldi, Reinny Patrisina, Asmuliardi Muluk, Lecturers of Industrial Engineering

Course coordinator: Jonrinaldi, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Daellenbach, H. G., dan McNickle, D., C. (2005). Management science; decision making through system thinking; Palgrave Macmillan, New York.

Other supplemental materials

Daellenbach, H. G. (1994). Systems and decision making; John Wiley & Sons, Chichester-England.

Murthy, D.N.P., Page, M.W., and Rodin E.Y. (1990). Mathematical modelling; Pergamon Press.

Relevant articles

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

In this course students learn the system concept and thinking, classification of the system and model, system approach in decision making, and the methodology in system modelling; problem statement, mathematical modelling, deriving the solution of the model, verification and validation, analysis of the solution (analysis of sensitivity and error analysis), and implementation of the model.

Pre-requisites or co-requisites

TIN 206

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the system concept and thinking and classification the model
 - ii. Explain the methodology of system modelling in solving industrial and business problems,
 - iii. Formulate the problem of integrated real system
 - iv. Develop and formulate the mathematical model of the industrial engineering problems
 - v. Create solution techniques or procedures of the mathematical model resulted
 - vi. Verify and validate the mathematical models resulted
 - vii. Analyse the results of the solution of the industrial engineering problems
 - viii. Interpret and implement the solution of the problems into the real system
 - ix. Write and present case study report of the problems studied, formulate mathematical model and solution procedure, analysis of the model and implementation of the model
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the system concept and thinking and classification the model	1, 3
ii.	Ability to explain the methodology of system modelling in solving industrial and business problems,	1, 3
iii.	Ability to formulate the problem of integrated real system	1
iv.	Ability to develop and formulate the mathematical model of the industrial engineering problems	1
v.	Ability to create solution techniques or procedures of the mathematical model resulted	1, 2
vi.	Ability to verify and validate the mathematical models resulted	1, 2
vii.	Ability to analyse the results of the solution of the industrial engineering problems	4
viii.	Ability to interpret and implement the solution of the problems into the real system	4
ix.	Ability to write and present case study report of the problems studied, formulate mathematical model and solution procedure, analysis of the model and implementation of the model	3

Brief list of topics to be covered

- i. Introduction to system modelling
- ii. System thinking

- iii. System concept
- iv. Classification of the model
 - v. Methodology of system modelling consisting of problem formulation, problem modelling and implementation of the model
- vi. Mathematical modelling
- vii. Deriving the solution of the model
- viii. Verification and validation
- ix. Analysis of sensitivity and error analysis
 - x. Implementation of the model
- xi. Presentation of class project

TIN 308
Industrial Engineering Design II

Course number and name

TIN 308: Industrial Engineering Design II

Credits and contact hours

2 Credit Hours (100 minutes per week of lab work)

Instructor's or course coordinator's name

Instructor: Alizar Hasan, Alexie Herryandie BA., Ikhwan Arief, Elita Amrina, Difana Meilani, Wisnel, Asmuliardi Muluk, Prima Fithri, Lecturers of Industrial Engineering

Course coordinator: Prima Fithri, Professor of Industrial Engineering

Text book, title, author, and year

Text book

Dessler, Gerry. 1993. Manajemen Sumber Daya Manusia. Human Ressouce Management 7 c, Edisi Indonesia, Jilid 2, Jakarta, Prenhaliindo

Management Information Systems 10th Edition, Raymond McLeod and George Schell, 2008

Other supplemental materials

Helmi, Syafrizal S. 2006. Buku Ajar Studi Kelayakan Bisnis. Departemen Manajemen Fakultas ekonomi : Universitas Sumatera Utara.

Husnan, Suad dan Suwarsono. 1994. Studi Kelayakan Proyek. Edisi Ketiga. Yogyakarta: Unit Penerbit dan Percetakan AMP YKPN.

Kasmir dan Jakfar. 2007. Studi Kelayakan Bisnis. Edisi Kedua. Cetakan Keempat. Jakarta: Penerbit Prenada Media Grup.

Pujawan, I Nyoman. 2003. Ekonomi Teknik, Edisi Pertama. Surabaya: GunaWidya

Sucipto, Agus. 2010. Studi Kelayakan Bisnis: Analisis Integratif dan Studi Kasus. Malang: UIN Maliki Press.

Suryana. 2003. Kewirausahaan: Pedoman Praktis, Kiat dan Proses Menuju Sukses. Bandung: Salempa Empat.

(Optional references)

Specific course information

Brief description of the content of the course (catalogue description)

In this course students practice the basic concept of organizational planning, how to draw the appropriate organization, determine job specification and job description. Students also practice how calculate the wage and salary of the employee, determine the cost of goods manufactured, break even point, and evaluate the feasibility of the company designed. Furthermore, students analyze and design the system of the company by drawing the business process diagram, system

requirement, use case diagram, use case description, and class diagram. Then, they design database by making entity relationship diagram after making normalized table and finally implementing information system with user interface and system prototype.

Pre-requisites or co-requisites

TIN 212, TIN 303

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Describe the profile of the company designed and business process such as company activities, value chain, information flow, design the company organization, draw organizational structure, and explain job description and specification of each job in the company
- ii. Calculate the wage, salary and bonus for each position in the company and determine the best method to calculate them
- iii. Determine the components of costs, depreciation, cost of goods manufactured, cost of goods sold, break even point, profit loss analysis
- iv. Explain and conduct the feasibility study of business design based on economic and non economic aspects
- v. Understand and draw business process diagram, system requirement, use case diagram, use case description, and class diagram
- vi. Understand normalized table, and make entity relationship diagram (ERD), and design initial user interface
- vii. Design the prototype of information system of the company.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe the profile of the company designed and business process such as company activities, value chain, information flow, design the company organization, draw organizational structure, and explain job description and specification of each job in the company	1, 2, 3

ii.	Ability to calculate the wage, salary and bonus for each position in the company and determine the best method to calculate them	1, 2, 6
iii.	Ability to determine the components of costs, depreciation, cost of goods manufactured, cost of goods sold, break even point, profit loss analysis	1, 2, 6
iv.	Ability to explain and conduct the feasibility study of business design based on economic and non economic aspects	1, 2
v.	Ability to understand and draw business process diagram, system requirement, use case diagram, use case description, and class diagram	1, 2
vi.	Ability to understand normalized table, and make entity relationship diagram (ERD), and design initial user interface	1, 2, 6
vii.	Ability to design the prototype of information system of the company	1, 2, 3

Brief list of topics to be covered

- i. Organization planning
- ii. Human resources planning
- iii. Cost analysis
- iv. Financial feasibility analysis
- v. System design and analysis
- vi. Database design
- vii. Implementation of information

TIN 312
Research Methodology

Course number and name

TIN 312: Research Methodology

Credits and contact hours

2 Credit Hours (100 minutes per weeks)

Instructor's or course coordinator's name

Instructor: Rika Ampuh Hadiguna, Hilma Raimona Zadry, Elita Amrina, Nilda Tri Putri, Jonrinaldi, Alizar Hasan, Lecturers of Industrial Engineering

Course coordinator: Alizar Hasan, Professor of Industrial Engineering

Text book, title, author, and year

Text book

Metoda Penelitian, M. Nazir, Ghalia Indonesia, 2003.

Sampling Techniques, W.G. Cochran, 2nd Ed., John Wiley And Sons, 1963

Metode Penelitian Survei, M. Singarimbun And S. Effendi, Lp3Es, 1982

Other supplemental materials

Filsafat Ilmu: Sebuah Pengantar Populer, J. S. Sumantri, Pustaka Sinar Harapan, 2003.

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

This course discuss the concept of science and knowledge, the concept of scientific method, research, problem formulation, hypothesis procedure and finally producing research proposal. Students are involved to work in a group, formulate problem, do hypothesis, collect, calculate and analyze the data, and draw conclusion. In each phase of learning, students are active in individual and group work, present the opinion and do peer review.

Pre-requisites or co-requisites

SSI 110, SSE 128

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Have the knowledge, understanding and application of the concept of research methodology including: science and research; research method, research design, collecting data, writing scientific report
 - ii. Have the soft skill such as work in team, initiative, ethics commitment, and communication.
 - iii. Apply the concept of research methodology to solve the real problems
 - iv. Write the research proposal in accordance with the concept of research methodology
 - v. Present the task of research proposal report.
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 3, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to have the knowledge, understanding and application of the concept of research methodology including: science and research; research method, research design, collecting data, writing scientific report	3, 4
ii.	Ability to have the soft skill such as work in team, initiative, ethics commitment, and communication.	3, 4
iii.	Ability to apply the concept of research methodology to solve the real problems	3, 4
iv.	Ability to write the research proposal in accordance with the concept of research methodology	3
v.	Ability to present the task of research proposal report	3

Brief list of topics to be covered

- i. Science and research
- ii. Research method
- iii. Research design
- iv. Data collection
- v. Data analysis
- vi. Writing scientific report

TIN 314
Facilities Layout Design

Course number and name

TIN 314: Facilities Layout Design

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Rika Ampuh Hadiguna, Alfadhlani, Reinny Patrisina, Lecturers of Industrial Engineering

Course coordinator: Rika Ampuh Hadiguna, Professor of Industrial Engineering

Text book, title, author, and year

Text book

Facilities Design, S. Heragu, PWS Publishing, 1997.

Facilities Planning, 2nd ed., J.A. Tompkins, J.A. White, Y.A. Bozer, E.H. Frazelle, J.M.A. Tanchoco dan J. Travino, Jhon Wiley & Sons Inc, 1996.

Other supplemental materials

Plant Layout and Material Handling, 3rd ed., J.M. Apple, Wiley, 1997.

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

This course discusses how to design the good layout for manufacturing and service facilities and how to balance production flow in the product oriented facility. Learning object used is plant facility layout.

Pre-requisites or co-requisites

TIN 203, TIN 218

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the layout problems in general and manufacturing facilities
- ii. Explain the types of layout
- iii. Apply the various charts (OPC, FPC, AC, MPPC) in layout design context
- iv. Calculate required number of machines

- v. Explain the flow pattern of production
 - vi. Apply the conventional methods in arranging machines
 - vii. Apply mathematical and clustering models for machine formation
 - viii. Apply mathematical model to determine storage or warehouse policies
 - ix. Apply mathematical model to select material handling equipment
 - x. Design complete plant facility layout
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*
 Course addresses/ supports ABET Student Outcome(s): 1, 2, 3

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the layout problems in general and manufacturing facilities	2
ii.	Ability to explain the types of layout	2
iii.	Ability to apply the various charts (OPC, FPC, AC, MPPC)in layout design context	2
iv.	Ability to calculate required number of machines	1, 2
v.	Ability to explain the flow pattern of production	2
vi.	Ability to apply the conventional methods in arranging machines	1, 2
vii.	Ability to apply mathematical and clustering models for machine formation	1, 2
viii.	Ability to apply mathematical model to determine storage or warehouse policies	1, 2
ix.	Ability to apply mathematical model to select material handling equipment	1, 2
x.	Ability to design complete plant facility layout	1, 2, 3

Brief list of topics to be covered

- i. Introduction to layout problems and types
- ii. Flow pattern analysis
- iii. Operations and processes analysis
- iv. Number of machines planning
- v. Conventional techniques for machine formations
- vi. Mathematical Models for machine formations
- vii. Clustering models for machine formations
- viii. Warehouse and storage planning
- ix. Material handling system

x. Group technology layout

TIN 316
Supply Chain System

Course number and name

TIN 316: Supply Chain System

Credits and contact hours

2 Credit Hours (100 minutes per weeks)

Instructor's or course coordinator's name

Instructor: Henmaidi, Dicky Fatrias, Alexie Herryandie B.A., Jonrinaldi, Lecturers of Industrial Engineering

Course coordinator: Henmaidi, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Supply Chain Management: Strategy, Planning & Operations, Chopra, S. Meindl, P., 3rd Edition, Pearson Prentice Hall, 2007 (CM)

Designing and managing the Supply Chain: Concepts, Strategies, and Case Studies, Simchi-Levi-D., Karminsky P., Simchy-Levi, E., McGraw Hill, 2000

Other supplemental materials

Handbook of Supply Chain Management, Ayes, J. B., the St. Lucie Press, 2000

Any related materials

Specific course information

Brief description of the content of the course (catalog description)

This course covers some issues in supply chain management, starting from strategic importance of good supply chain design, planning, and operation for every firm. It gives the understanding how good supply chain management can be a competitive advantage, whereas weaknesses in the supply chain can hurt the performance of a firm. Furthermore, this course identifies supply chain drivers in terms of facilities, inventory, transportation, information, sourcing, and pricing as the key drivers of supply chain performance, and how these drivers may be used on a conceptual and practical level during supply chain design, planning, and operation to improve performance. For each driver of supply chain performance, the goal is to provide student with practical managerial levers and concepts that may be used to improve supply chain performance. Utilizing these managerial levers requires knowledge of analytic methodologies for supply chain analysis.

Pre-requisites or co-requisites

TIN 218, TIN 301

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Identify factors influencing supply chain network design decisions and use optimization for facility location and capacity allocation decisions.
- ii. Use the methodologies used to evaluate supply chain design decisions under uncertainty and analyse supply chain network design decisions in an uncertain environment.
- iii. Describe how a company achieves strategic fit between its supply chain strategy and its competitive strategy.
- iv. Use aggregate planning to maximize profitability when faced with predictable variability in a supply chain.
- v. Identify managerial levers that reduce lot size and cycle inventory in a supply chain without increasing cost.
- vi. Explain the strengths and weaknesses of different modes of transportation.
- vii. Discuss factors that affect the decision to outsource a supply chain function.
- viii. Identify conditions under which revenue management tactics can be effective.
- ix. Describe the impact of coordination and the bullwhip effect on performance, and explain actions that facilitate the building of strategic partnerships and trust within a supply chain.
- x. Explain the importance of information technology, the major applications of supply chain information technology and the processes that they enable.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1, 2, 4

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i	Identify factors influencing supply chain network design decisions and use optimization for facility location and capacity allocation decisions.	1, 2, 4
ii	Use the methodologies used to evaluate supply chain design decisions under uncertainty and analyse supply chain network design decisions in an uncertain environment.	1, 2, 4
iii	Describe how a company achieves strategic fit between its supply chain strategy and its competitive strategy.	2, 4
iv	Use aggregate planning to maximize profitability when faced with predictable variability in a supply chain.	1, 2
v	Identify managerial levers that reduce lot size and cycle inventory in a supply chain without increasing cost.	1, 2

vi	Explain the strengths and weaknesses of different modes of transportation.	2, 4
vii	Discuss factors that affect the decision to outsource a supply chain function.	2, 4
viii	Identify conditions under which revenue management tactics can be effective.	2, 4
ix	Describe the impact of coordination and the bullwhip effect on performance, and explain actions that facilitate the building of strategic partnerships and trust within a supply chain.	2, 4
x	Explain the importance of information technology, the major applications of supply chain information technology and the processes that they enable.	2, 4

Brief list of topics to be covered

- i. Understanding the Supply Chain
- ii. Designing Supply Chain Network
- iii. Planning demand and supply in a Supply Chain
- iv. Planning and managing inventories in a Supply Chain
- v. Planning Transportation Network
- vi. Sourcing Planning and Analysis
- vii. Pricing and Revenue Management
- viii. Coordination in a Supply Chain
- ix. Information Technology in a Supply Chain

TIN 320
Internship Program

Course number and name

TIN 320: Internship Program

Credits and contact hours

2 Credit Hours

Instructor's or course coordinator's name

Instructor: Feri Afrinaldi, Lecturer of Industrial Engineering

Course coordinator: Feri Afrinaldi, Lecturer of industrial engineering department

Text book, title, author, and year

Text book

Tim Dosen Jurusan Teknik Industri. (2015). Buku Panduan Kerja Praktek. Jurusan Teknik Industri Universitas Andalas

Other supplemental materials

Purdue Online Writing Lab.(2016). APA Formatting and Style Guide

Specific course information

Brief description of the content of the course (catalogue description)

This course provides practical experience in a manufacturing company for the students. The students are expected to get real experience of work activity in the company considering ethical aspect and professionalism. Students are probably asked to solve a small project under supervision by advisers from the company and university.

Pre-requisites or co-requisites

TIN 213, TIN 312

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the general profile of the company and division where they take internship program
- ii. Participate and contribute to the team during internship program
- iii. Give appreciation to all parties involved during internship program
- iv. Be responsible and on time carrying out the task during internship program

- v. Respond the difference of background and role appropriately and put the team as the priority
 - vi. Show the commitment to work during intern
 - vii. Apply the principles of work safety and health
 - viii. Identify and formulate the problem and solve the project during internship program
 - ix. Communicate the result of the identification, formulation and solution of the problem discussed effectively
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*
 Course addresses/ supports ABET Student Outcome(s): 3, 4, 5, 7

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Explain the general profile of the company and division where they take internship program	3, 4, 5, 7
ii.	Participate and contribute to the team during internship program	3, 5
iii.	Give appreciation to all parties involved during internship program	4
iv.	Be responsible and on time carrying out the task during internship program	4
v.	Respond the difference of background and role appropriately and put the team as the priority	4, 5
vi.	Show the commitment to work during intern	4
vii.	Apply the principles of work safety and health	4
viii.	Identify and formulate the problem and solve the project during internship program	3, 7
ix.	Communicate the result of the identification, formulation and solution of the problem discussed effectively	3

Brief list of topics to be covered

- i. General profile of the company and division where the internship program performed
- ii. Professionalism and ethics
- iii. Collaboration in team
- iv. Problem identification and formulation
- v. Method selection
- vi. Data collection
- vii. Identification of alternative solution
- viii. Choosing the solution

- ix. Writing report according to scientific writing rules
- x. Effective presentation

TIN 401
Enterprise Design and Analysis

Course number and name

TIN 401: Enterprise Design and Analysis

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Afri Adnan, Nilda Tri Putri, Lecturers of Industrial Engineering

Course coordinator: Nilda Tri Putri, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Umar, Husein (2003), Studi Kelayakan Bisnis, Penerbit: PT Gramedia Pustaka Utama, Jakarta.

Suliyanto (2010), Studi Kelayakan Bisnis: Pendekatan Praktis, Penerbit: ANDI Yogyakarta.

Musrofi, Muhammad (2006), Kunci Sukses Berwirausaha, PT Elex Media Komputindo, Jakarta

Other supplemental materials

Rangkutti, Freddy. 2000. Business Plan. Jakarta: PT. Gramedia Pustaka Utama

Optional references

Suliyanto. 2010. Studi Kelayakan Bisnis: Pendekatan Praktis. Yogyakarta: ANDI

Specific course information

Brief description of the content of the course (catalogue description)

This course learns about business plan and the feasibility study of an investment/project/business to be executed or being executed. The feasibility study covering aspects of the market, environmental, social and cultural, technical and technology, economics and finance, management and human resources, law and ergonomics.

Pre-requisites or co-requisites

TLI 110, TIN 203, TIN 302

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain properly the definition of the business, types of the business, business aspects (market and marketing, technical and technological aspects, resources and management aspects, law aspect, environmental aspect, financial aspect), business systems and

- elements, definition of business/investment feasibility study, goals and benefits of business feasibility study and the design of business feasibility study
 - ii. Conclude that the result of analysis of aspects in business design is feasible
 - iii. Describe the steps in the business feasibility study including market and marketing, technical and technological aspects, resources and management aspects, law aspect, environmental aspect, financial aspect
 - iv. Determine and detail the data needed for each aspect needed for the business feasibility study
 - v. Write business plan proposal and present it
 - vi. Work in team
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*
- Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4, 5

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain properly the definition of the business, types of the business, business aspects (market and marketing, technical and technological aspects, resources and management aspects, law aspect, environmental aspect, financial aspect), business systems and elements, definition of business/investment feasibility study, goals and benefits of business feasibility study and the design of business feasibility study	2, 4
ii.	Ability to conclude that the result of analysis of aspects in business design is feasible	2, 4
iii.	Ability to describe the steps in the business feasibility study including market and marketing, technical and technological aspects, resources and management aspects, law aspect, environmental aspect, financial aspect	1, 2, 4
iv.	Ability to determine and detail the data needed for each aspect needed for the business feasibility study	1, 2, 4
v.	Ability to write business plan proposal and present it	2, 3
vi.	Ability to work in team	5

Brief list of topics to be covered

- i. Introduction: Definition of the business, types of the business, business aspects, business systems and elements, definition of business/investment feasibility study, goals and benefits of business feasibility study and the design of business feasibility study.

- ii. Market and marketing aspects
- iii. Technical and technological aspects
- iv. Organizational and management aspects
- v. Law aspect
- vi. Social and environmental aspects
- vii. Financial aspect

TIN 403
Computer Simulation

Course number and name

TIN 403: Computer Simulation

Credits and contact hours

3 Credit Hours (150 minutes per week)

Instructor's or course coordinator's name

Instructor: Rika Ampuh Hadiguna, Wisnel, Eri Wirdianto, Elita Amrina, Lecturers of Industrial Engineering

Course coordinator: Eri Wirdianto, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Banks, J., Carson II, J.S., Nelson, B.L., Nicol, D.M. (2010). Discrete-Event System Simulation (5th Edition). Pearson Education, Upper Saddle River, NJ.

Kelton, W.D., Sadowski, R., Zupick, N. (2010). Simulation with Arena (5th Edition). McGraw-Hill Higher Education, New York, NY.

Other supplemental materials

Banks, Jerry, (1998). Handbook of Simulation, Principles, Methodology, Advances, Applications, and Practice, John Wiley & Sons, Inc.

Specific course information

Brief description of the content of the course (catalogue description)

This course aims to introduce the concept of system simulation, how to use simulation one of tools to solve industrial engineering problems, when simulation must be used, and advantages and disadvantages of the simulation. This course introduces system concept, components of the system, types of the system, models of the system, an types of models. In the class, students are introduced to techniques to generate and test random numbers and random variate. Two types of simulation discussed in this course are Monte Carlo simulation and Discrete-event simulation. Monte Carlo simulation is built by using Microsoft Excel. Discrete-event simulation is built by using ARENA software.

Pre-requisites or co-requisites

TIN 104, TIN 208, TIN 301, TIN 306,

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Explain the basic concept of system, types of simulation, and when the simulation must be used
- ii. Explain system concepts, components of the system, types of the system, models of the system, and types of the model
- iii. Generate random numbers
- iv. Generate random variate
- v. Solve industrial engineering problems by building, programming, analyzing, and comparing Monte Carlo simulation model and data resulted
- vi. Solve industrial engineering problems by building, programming, analyzing, and comparing discrete-event simulation model and data resulted.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 3, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the basic concept of system, types of simulation, and when the simulation must be used	6
ii.	Ability to explain system concepts, components of the system, types of the system, models of the system, and types of the model	6
iii.	Ability to generate random numbers	3, 6
iv	Ability to generate random variate	3, 6
v	Ability to solve industrial engineering problems by building, programming, analyzing, and comparing Monte Carlo simulation model and data resulted	3, 6
vi	Ability to solve industrial engineering problems by building, programming, analyzing, and comparing discrete-event simulation model and data resulted	3, 6

Brief list of topics to be covered

- i. Introduction to system simulation
- ii. The concept of simulation, types of simulation, and when the simulation must be used
- iii. System concepts, components of the system, types of the system, models of the system, types of models
- iv. Monte Carlo simulation

- v. Random numbers generation
- vi. Random variate generation
- vii. Discrete-event simulation manually
- viii. Discrete-event simulation using ARENA software

TIN 407
Entrepreneurship

Course number and name

TIN 407: Entrepreneurship

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Insannul Kamil, Henmaidi, Lusi Susanti, Reinny Patrisina, Lecturers of Industrial Engineering

Course coordinator: Henmaidi, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text books

Kewirausahaan, Buchari Alma, Penerbit Alfabeta, 2009

Modul Kewirausahaan, Rhenald Kasali et al, 2010

Specific course information

Brief description of the content of the course (catalogue description)

In this course students learn how to become an entrepreneur, the change thinking, soft skill and entrepreneur's excellent character including creative thinking, action oriented, risk taking, leadership, business ethics, and finding new ideas, marketing, finances management and budgeting, beginning new business, and business plan.

Pre-requisites or co-requisites

TIN 302

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Describe the concept of entrepreneurship
- ii. Attain soft skill and excellent character that needed by entrepreneurs.
- iii. Develop a business including planning, market segmentation, marketing strategy, financial management
- iv. Write a good business proposal

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 3

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to describe the concept of entrepreneurship	3
ii.	Ability to attain soft skill and excellent character that needed by entrepreneurs.	3
iii.	Ability to develop a business including planning, market segmentation, marketing strategy, financial management	1, 3
iv.	Ability to write a good business proposal	1, 3

Brief list of topics to be covered

- i. Become entrepreneurs
- ii. The change thinking
- iii. Soft skill and entrepreneurs excellent character
 - a. Creative thinking
 - b. Action oriented
 - c. Risk taking
 - d. Leadership
 - e. Business ethics
 - f. Finding new ideas
- iv. Marketing
- v. Finances management and budgeting
- vi. Beginning new business
- vii. Developing a business plan

TIN 409
Product Design and Development

Course number and name

TIN 409: Product Design and Development

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Feri Afrinaldi, Reinny Patrisina, Hilma Raimona Zadry, Prima Fithri, Lecturers of Industrial Engineering

Course coordinator: Reinny Patrisina, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Cross N, Engineering Design Methods: Strategies for Product Design, John Wiley & Sons, Second Edition, 1994.

Kotler P at all, Marketing Management: An Asian Perspective, Pearson Prentice Hall, Third Edition, 2003.

Ulrich K.T, Eppinger S.D, Product Design and Development, McGraw-Hill, Second Edition, 2000.

Urban G.L, Hauser J.R, Design and Marketing of New Products, Prentice Hall International Editions, second Edition, 1993.

Wind Y.J, Product Policy, Addison-Wesley Publishing Company, Massachusetts, 1982.

Graedel, T.E., Allenby, B.R. (2003). Industrial Ecology 2nd Ed. Prentice Hall, Upper Saddle River, NJ.

Other supplemental materials

Kutz, M. (Ed.). (2007). Environmental Conscious Manufacturing. John Wiley & Sons, Hoboken, NJ.

Lambert, A.J.D, Gupta, S.M. (2005). Disassembly Modeling for Assembly, Maintenance, Reuse, and Recycling.

Guidice, F., Rosa, G.L., Risitano, A. (2006). Product Design for the Environment. Taylor & Francis, Boca Raton, FL.

Specific course information

Brief description of the content of the course (catalogue description)

This course aims to introduce the students to the basic concepts of engineering design and product development with focus on the front end processes of product produced. The course also develop students' understanding on sustainable product design. It is expected that the students will be able to assess the consequence of the product design on the environment, economic, and society. The

understanding will be developed by introducing the following concepts and techniques: design for the environment, life cycle assessment (LCA), life cycle costing, and social life cycle assessment. At the end of this course the students are expected to demonstrate and understand of the overview of all the product development process and knowledge of the concept of tools and material selections which will be used.

Pre-requisites or co-requisites

TLI 110, TIN 203, TIN 216, TIN 313,

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. Specific outcomes of instruction

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

- i. Explain the importance of product design, design process and development process, barriers to product development, and product life cycle
- ii. Explain the product development and apply product design planning
- iii. Identify customer needs and apply the methods and techniques to measure customer perceptions and preferences
- iv. Establish the target specification and final specification
- v. Explain the concept of material selection in the design and development
- vi. Explain the product structure drawing
- vii. Use the methods and tools for the product design and development
- viii. Explain the sustainable product design
- ix. Explain the material hazards, material availability, and material substitution, recycle of product, energy efficiency, material process impact, product delivery, and environmental interaction during the product use in designing the product.
- x. Explain the step-by-step procedures of life cycle assessment (LCA), the types of impact caused, and impact assessment methodologies, and the application of LCA to evaluate environmental impact of the product design.
- xi. Explain the step-by-step procedures of life cycle costing, the types of cost estimation techniques, and application of the life cycle costing methods to evaluate the economic impact caused of the product design.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
1	Ability to explain the importance of product design, design process and development process, barriers to product development, and product life cycle	2, 3, 4
2	Ability to explain the product development and apply product design planning	2, 3, 4
3	Ability to identify customer needs and apply the methods and techniques to measure customer perceptions and preferences	1, 2, 3, 4, 6
4	Ability to establish the target specification and final specification	1, 2, 3, 4, 6
5	Ability to explain the concept of material selection in the design and development	1, 2, 3, 4, 6
6	Ability to explain the product structure drawing	1, 2, 4, 6
7	Ability to use the methods and tools for the product design and development	1, 2, 4, 6
8	Ability to explain the sustainable product design	2, 3, 4
9	Ability to explain the material hazards, material availability, material substitution, recycle of product, energy efficiency, material process impact, product delivery, and environmental interaction during the product use in designing the product.	2, 3, 4
10	Ability to explain the step-by-step procedures of life cycle assessment (LCA), the types of impact caused, and impact assessment methodologies, and the application of LCA to evaluate environmental impact of the product design.	1, 2, 3, 4
11	Ability to explain the step-by-step procedures of life cycle costing, the types of cost estimation techniques, and application of the life cycle costing methods to evaluate the economic impact caused of the product design	1, 2, 3, 4

Brief list of topics to be covered

- i. Introduction to Product Design and Development
- ii. The important of product design, product development process, barriers to product development, product life cycle
- iii. Explanation of product development process and application of product design planning
- iv. Identification of consumer needs and application of methods and techniques to measure consumer choice and perception
- v. Establishment of target specification and final specification

- vi. Explanation of the concepts of generalization and choosing of the design and product development
- vii. Explanation of product structure and its impact
- viii. Product development by using design concept and tools and product development
- ix. Explanation and application of the principles of material hazard, material availability, material substitution, recycling process, efficiency of the energy, the impact of material process product delivery, and environmental interaction during the use of product
- x. Explanation of the steps and procedures of life cycle assessment (LCA), types of impact, and assessment impact, application LCA method to evaluate environmental impact of the product design
- xi. The steps of life cycle costing, types of cost estimations, and application of life cycle costing to evaluate environmental impact of product design
- xii. The steps of social life cycle, types of techniques used, and application of social life cycle to evaluate environmental impact of product design

AND 401

Community Service and Development (KKN)

Course number and name

AND 401: Community Service and Development (KKN)

Credits and contact hours

3 Credit Hours

Instructor's or course coordinator's name

Instructor: Faculty, Selected Lectures of Universitas Andalas

Course coordinator: Appointed by Rector

Text book, title, author, and year

Text book

Panduan Pelaksanaan KKN

Other supplemental materials

Any materials determined by the students' supervisors based on area and theme requirements

Specific course information

Brief description of the content of the course (catalogue description)

This course provides real life and practical experience for students to live in society and contribute in community empowerment. This course provides students a comprehensive experience to interact with other students from different departments, faculty members as field supervisors, community. They work together to identify, select an activity or program, develop a planning, share the task and responsibility, execute and evaluate the program and complete individual and team written reports in schedule. This course duration is five weeks, where students will stay with the community in the selected rural area.

Pre-requisites or co-requisites

-

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

c. Specific outcomes of instruction

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

- i. Apply knowledge attained to solve real world problems
- ii. Communicate with any people that have the different background
- iii. Work in multidisciplinary team to solve real case problems
- iv. Engage in lifelong learning

- v. Show responsibility, commitment, and ethics in real life
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 3, 4, 5, 7

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to apply knowledge attained to solve real world problems	5
ii.	Ability to communicate with any people that have the different background	3
iii.	Ability to work in multidisciplinary team to solve real case problems	5
iv.	Ability to engage in lifelong learning	7
v.	Ability to show responsibility, commitment, and ethics in real life	4

Brief list of topics to be covered

- i. Introduction to KKN program
- ii. Team formation and preliminary surveys
- iii. Implementation of KKN program at KKN location
- iv. Writing KKN activity report

TIN 480 Seminar

Course number and name

TIN 480: Seminar

Credits and contact hours

2 Credit Hours

Instructor's or course coordinator's name

Instructor: Feri Afrinaldi, Lecturer of Industrial Engineering

Course coordinator: Feri Afrinaldi, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Tim Dosen Jurusan Teknik Industri. (2015). Buku Panduan Seminar dan Tugas Akhir. Jurusan Teknik Industri Universitas Andalas

Other supplemental materials

Purdue Online Writing Lab.(2016). APA Formatting and Style Guide

Specific course information

Brief description of the content of the course (catalogue description)

This course is delivered to prepare the final project proposal of the students. Students are supervised by faculty. This course focus on learning problem identification and formulation process of the final project proposal, literature review, method selection to solve the problem, writing report process according to scientific writing rules and academic ethics in doing research.

Pre-requisites or co-requisites

SSI 110, SSE 128, TIN 320, TIN 312

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Conduct investigation, identification and problem formulation process
- ii. Search the literature which are relevant to the topics of final project proposal from various media, select and make summary (own sentences)
- iii. Select the appropriate methods to solve the problem of the final project proposal based on literature review conducted
- iv. Write the report according to scientific writing rules and present it.

- v. Complete the task in schedule and according to the rules
 - vi. Present the report and responds adequately questions and discussion.
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 3

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Conduct investigation, identification and problem formulation process	3
ii.	Search the literature which are relevant to the topics of final project proposal from various media, select and make summary (own sentences)	3
iii.	Select the appropriate methods to solve the problem of the final project proposal based on literature review conducted	3
iv.	Write the report according to scientific writing rules and present it.	3
v.	Complete the task in schedule and according to the rules	3
vi.	Present the report and responds adequately questions and discussion	3

Brief list of topics to be covered

- i. Rules and management of Seminar
- ii. Problem identification and formulation and their writing rules
- iii. Literature and its writing rules
- iv. Method selection and its writing rules
- v. Effective oral presentation techniques

TIN 490
Final Project

Course number and name

TIN 490: Final Project

Credits and contact hours

4 Credit Hours

Instructor's or course coordinator's name

Instructor: Feri Afrinaldi, Lecturer of Industrial Engineering

Course coordinator: Feri Afrinaldi, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Tim Dosen Jurusan Teknik Industri. (2015). Buku Panduan Seminar dan Tugas Akhir. Jurusan Teknik Industri Universitas Andalas

Other supplemental materials

Purdue Online Writing Lab.(2016). APA Formatting and Style Guide

Specific course information

Brief description of the content of the course (catalog description)

This course is the academic activity of students in the form of research. This course expected that students produce monumental scientific work as the one of requirements to get the bachelor degree. The final project reports are expected to be references for other students at Universitas Andalas and outside. The quality of the final project report is responsibility of all academicians.

Pre-requisites or co-requisites

SSI 110, SSE 128, TIN 320, TIN 312

Indicate whether a required, elective, or selected elective course in the program

Required course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Conduct investigation, identification and problem formulation process
- ii. Search the literature which are relevant to the topics of final project proposal from various media, select and make summary (own sentences)
- iii. Select the appropriate methods to solve the problem of the final project proposal based on literature review conducted

- iv. Determine the types and size of data needed to solve the problem in the final project students will able to present their final project
 - v. Determine and prepare the tools used (data collection sheet, time-sheet, checklist, interview, questionnaire, video, etc.) to collect data in order to solve the problem in the final project
 - vi. Present the data collected into table and graph (histogram, pie chart, bar diagram, etc.)
 - vii. Interpret the information provided by the data
 - viii. Identify the feasible alternative solution for the problem of the final project
 - ix. Select the criteria to determine the best alternative to solve the problem of the final project
 - x. Predict the impact of each alternative solution using the concepts of industrial engineering discipline, engineering, mathematics, science, and social science.
 - xi. Select the best alternative solution
 - xii. Write the final project report according to scientific writing rules and present it orally
 - xiii. Complete the final project report in schedule and according to rules
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 3, 4, 7

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to conduct investigation, identification and problem formulation process	1, 3, 4, 7
ii.	Ability to search the literature which are relevant to the topics of final project proposal from various media, select and make summary (own sentences)	3, 7
iii.	Ability to select the appropriate methods to solve the problem of the final project proposal based on literature review conducted	3, 7
iv.	Ability to determine the types and size of data needed to solve the problem in the final project students will able to present their final project	1, 2, 6, 7
v.	Ability to determine and prepare the tools used (data collection sheet, time-sheet, checklist, interview, questionnaire, video, etc.) to collect data in order to solve the problem in the final project	1, 2, 3, 6, 7
vi.	Ability to present the data collected into table and graph (histogram, pie chart, bar diagram, etc.)	1, 2, 3, 6, 7
vii.	Ability to interpret the information provided by the data	1, 2, 3, 6, 7

viii.	Ability to identify the feasible alternative solution for the problem of the final project	1, 2, 3, 6
ix.	Ability to select the criteria to determine the best alternative solution to solve the problem of the final project	1, 2, 3, 6
x.	Ability to predict the impact of each alternative solution using the concepts of industrial engineering discipline, engineering, mathematics, science, and social science.	1, 2, 4, 6, 7
xi.	Ability to select the best alternative solution	1, 2, 4, 6, 7
xii.	Ability to write the final project report according to scientific writing rules and present it orally	3, 7
xiii.	Ability to complete the final project report in schedule and according to rules	3, 7

Brief list of topics to be covered

- i. Introduction to Final Project
- ii. Problem identification and formulation and their writing rules
- iii. Literature review and its writing rules
- iv. Method selection and its writing rules
- v. Data collection techniques
- vi. Data presentation and interpretation
- vii. Identification of alternative solution to solve the problem
- viii. Determination of criteria to select alternative solution
- ix. Prediction of the impact of each alternative solution using the concept of industrial engineering, engineering, mathematics, science, and social science
- x. Choosing the best alternative solution
- xi. Writing the final project report according to scientific writing rules
- xii. Effective oral presentation

TIN 411
Inventory System

Course number and name

TIN 411: Inventory System

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Jonrinaldi, Lecturer of Industrial Engineering

Course coordinator: Jonrinaldi, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Richard J. Tersine, Principles of Inventory and Materials Management, 4th Edition, Prentice-Hall, 1994.

Other supplemental materials

Senator Nur Bahagia, Sistem Inventori, ITB Bandung.

Relevant articles

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

In this course students learn the concept of inventory and inventory system, static deterministic inventory system, dynamic deterministic inventory system, probabilistic inventory system, single order inventory system, uncertainty inventory system, limitations in inventory system, advanced inventory system

Pre-requisites or co-requisites

TIN 205, TIN 218

Indicate whether a required, elective, or selected elective course in the program

Elective course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Define the inventory, inventory system, and inventory costs
- ii. Formulate the problems and performance of inventory system
- iii. Use the appropriate inventory systems and models
- iv. Analyze the result of solution of the inventory system

- v. Use the appropriate inventory systems and models considering the limitations of the systems
 - vi. Analyze the inventory models and formulate the limitation of the system
 - vii. Write and present the related topics
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*
- Course addresses/ supports ABET Student Outcome(s): 1, 2, 3

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to define the inventory, inventory system, and inventory costs	1, 2
ii.	Ability to formulate the problems and performance of inventory system	1, 2
iii.	Ability to use the appropriate inventory systems and models	1, 2
iv.	Ability to analyze the result of solution of the inventory system	1, 2
v.	Ability to use the appropriate inventory systems and models considering the limitations of the systems	1, 2
vi.	Ability to analyze the inventory models and formulate the limitation of the system	1, 2
vii.	Ability to write and present the related topics	3

Brief list of topics to be covered

- i. Introduction to inventory system
- ii. The concept of inventory and inventory system
- iii. Static deterministic inventory system
- iv. Dynamic deterministic inventory system
- v. Probabilistic inventory system
- vi. Single order inventory system
- vii. Uncertainty inventory system
- viii. Limitations in inventory system
- ix. Advanced inventory system
- x. Presentation of journal review

TIN 423
Decision Theory

Course number and name

TIN 423: Decision Theory

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Alexie Herryandi BA, Lecturer of Industrial Engineering

Course coordinator: Alexie Herryandie BA, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Making Hard Decision with Decision Tool. Clemen, R.T., T. Reilly., 3rd ed., South-Western Cengage Learning, 2013.

Marimin. Teknik dan Aplikasi Pengambilan Keputusan Kriteria Majemuk. Grassindo, Jakarta, 2004.

Other supplemental materials

Making Hard Decision. Clemen, R.T., T. Reilly., 2nd ed., Duxbury Press, 1996

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

In this course students learn to understand and be able to apply the concepts in decision making in order to solve industrial engineering problems.

Pre-requisites or co-requisites

TIN 205

Indicate whether a required, elective, or selected elective course in the program

Elective course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the concepts of the decision making, why decision making techniques needed, the steps in decision making
- ii. Decompose the decision problems and determine the decision that must be taken, uncertain things, values
- iii. Draw the structures of decision problems using influence diagram and decision tree

- iv. Determine the choice based on the expected value
- v. Conduct the analysis of sensitivity and select important variables to analyze decision problems further
- vi. Conduct the analysis of sensitivity to see the effects of two or three variables simultaneously in decision making problems
- vii. Consider the behavior to the risk and use utility function in decision making
- viii. Understand the concept of value tree, importance level of criteria and use the concept of multi criteria decision making
- ix. Use MPE method and SCPI, AHP, ME-MCDM and TOPSIS in multi criteria decision making

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the concepts of the decision making, why decision making techniques needed, the steps in decision making	1, 2
ii.	Ability to decompose the decision problems and determine the decision that must be taken, uncertain things, values	1
iii.	Ability to draw the structures of decision problems using influence diagram and decision tree	1, 2
iv.	Ability to determine the choice based on the expected value	1, 2
v.	Ability to conduct the analysis of sensitivity and select important variables to analyze decision problems further	1, 2
vi.	Ability to conduct the analysis of sensitivity to see the effects of two or three variables simultaneously in decision making problems	1, 2
vii.	Ability to consider the behavior to the risk and use utility function in decision making	1

Brief list of topics to be covered

- i. Decision making considering uncertainty
- ii. Risk behavior and utility function
- iii. Analysis of sensitivity
- iv. Multi criteria decision making

TIN 443
Cognitive Ergonomics

Course number and name

TIN 443: Cognitive Ergonomics

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Lusi Susanti, Desto Jumeno, Lecturers of Industrial Engineering

Course coordinator: Desto Jumeno, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Norman, D., the Design of Everyday Things, Basic Books, New York, 2013.

Other supplemental materials

Preece, J., Carey, T., Rogers, Y., Holland, S., Sharp, H., Benyon, D., Human-Computer Interaction, Addison-Wesley, New York, 1994

Wickens, C.D., Lee, J, Liu, Y.D., Gordon-Baker, S., Introduction to Human Factors Engineering, Pearson, New York, 2004

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

In this course students learn design, structure, and operations of interface between human as system user with the status and process of the system. This course assumes that how the human see, listen, pay attention to something, remember and make decision has the direct implication to artifact design and environment used.

Pre-requisites or co-requisites

TIN 216

Indicate whether a required, elective, or selected elective course in the program

Elective course for Industrial Engineering

Specific goals for the course

c. Specific outcomes of instruction

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

- i. Explain the definition and importance of cognitive ergonomics
- ii. Explain about the perception
- iii. Explain about the information processing on human

- iv. Explain about the perception
 - v. Explain about the human memory
 - vi. Explain about the attention
 - vii. Explain about the learning process
 - viii. Explain and design control interface
 - ix. Explain and design display interface
 - x. Explain about the situational awareness
 - xi. Explain about the human error
 - xii. Explain about the decision making
 - xiii. Explain about the human computer interaction
- d. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 2, 3

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain the definition and importance of cognitive ergonomics	2
ii.	Ability to explain about the information processing on human	2
iii.	Ability to explain about the perception	2
iv.	Ability to explain about the human memory	2
v.	Ability to explain about the attention	2
vi.	Ability to explain about the learning process	2, 3
vii.	Ability to explain and design control interface	2, 3
viii.	Ability to explain and design display interface	2, 3
ix.	Ability to explain about the situational awareness	2, 3
x.	Ability to explain about the human error	2, 3
xi.	Ability to explain about the decision making	2, 3
xii.	Ability to explain about the human computer interaction	2, 3

Brief list of topics to be covered

- i. Introduction to cognitive ergonomics
- ii. Information processing on human
- iii. Perception
- iv. Human memory
- v. Attention
- vi. Learning process
- vii. Cognitive control
- viii. Display

- ix. Situational awareness
- x. Human error
- xi. Decision making
- xii. Human computer interaction

TIN 412 Experimental Design

Course number and name

TIN 412: Experimental Design

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Ahmad Syafruddin Indrapriyatna, Alexie Herryandie BA, Lecturers of Industrial Engineering

Course coordinator: Ahmad Syafruddin Indrapriyatna, Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Design and Analysis of Experiments, 8th Edition, Montgomery, D. C., John Wiley & Sons, 2012.
Statistical Analysis of Designed Experiments, Third Edition, Toutenburg, Helge, Shalabh, Springer-Verlag New York, 2009

(http://www.lamolina.edu.pe/proyeccion/iso17025/bpl/Statistical_Analysis_of_Designed_Experiments.pdf).

Process Improvement Using Data, Dunn, Kevin, <https://learnche.org/pid/PID.pdf?419-67d8>, 2018.
A First Course in Design and Analysis of Experiment, Oehlert, Gary W., University of Minnesota, <http://users.stat.umn.edu/~gary/book/fcdae.pdf>, 2018.

Other supplemental materials

Teknik Analisis Dalam Penelitian Percobaan, Vincent Gaspersz, Jilid I dan II, Penerbit Tarsito, Bandung, 1995.

Desain dan Analisis Eksperimen, Sujana, Edisi IV, Penerbit Tarsito, Bandung, 2002.

Modul Pembelajaran SPSS, Pusat Data dan Statistik Pendidikan, Kemdikbud, 2014

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

In this course students learn the history and experimental design process. Students learn how to plan and perform experiment. This course assumes that how the human see, listen, pay attention to something, remember and make decision has the direct implication to artifact design and environment used. Students are provided the knowledge and be able to conduct the appropriate experimental design including: complete randomized design, group randomized design, square design, and factorial design. Students are able to identify, design, and evaluate the result of experiment.

Pre-requisites or co-requisites

TIN 205, TIN 208

Indicate whether a required, elective, or selected elective course in the program

Elective course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain the methodology in experimental design
- ii. Make the appropriate environmental design.
- iii. Make the plan of experiment which is relevant to condition
- iv. Make conclusion of experiment conducted
- v. Evaluate the treatment that provide the biggest effect.
- vi. Design the appropriate experiment

b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2, 6

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Explain the methodology in experimental design	2, 6
ii.	Make the appropriate environmental design.	1, 2, 6
iii.	Make the plan of experiment which is relevant to condition	2, 6
iv.	Make conclusion of experiment conducted	2, 6
v.	Evaluate the treatment that provide the biggest effect.	1, 2, 6
vi.	Design the appropriate experiment	2, 6

Brief list of topics to be covered

- i. Introduction to experimental design
- ii. The scale of measurement and types of environmental design
- iii. Complete randomized design
- iv. Group randomized design
- v. Missing data
- vi. Latin square design
- vii. Graeco-latin square design
- viii. Factorial design
- ix. Nested design

TIN 414
Just in Time Production System

Course number and name

TIN 414: Just in Time Production System

Credits and contact hours

2 Credit Hours (100 minutes per week)

Instructor's or course coordinator's name

Instructor: Elita Amrina, Lecturers of Industrial Engineering

Course coordinator: Elita Amrina, Senior Lecturer of Industrial Engineering

Text book, title, author, and year

Text book

Hirano, Hiroyuki, 2009, "JIT Implementation Manual - The Complete Guide to Just-in-Time Manufacturing", CRC Press, Taylor & Francis.

Other supplemental materials

Monden, Yasuhiro, 1993, "Sistem Produksi Toyota", Penerjemah: Dr. Edi Nugroho, Jakarta: Pustaka Binaman Pressindo.

Harison, Alan, 1992, "Just in time manufacturing in perspective", Prentice Hall International (UK) Ltd.

Schniederjan, Marc J., 1993, "Just In Time Management", Allyn & Bacon, USA

Ohno, Taiichi, 1995, "Just in time dalam sistem produksi Toyota", Edisi terjemahan, Jakarta: Pustaka Binaman Pressindo

(Optional references)

Specific course information

Brief description of the content of the course (catalog description)

This course aims to introduce the concept of just in time production system, the steps to apply it in production system as one of the production system known to solve industrial engineering problems. This course also introduce seru production system as the development of just in time production system.

Pre-requisites or co-requisites

TIN 218, TIN 304, TIN 308, TIN 315

Indicate whether a required, elective, or selected elective course in the program

Elective course for Industrial Engineering

Specific goals for the course

a. *Specific outcomes of instruction*

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

- i. Explain just in time production system, its history and development and the steps to apply
 - ii. Apply the 52 concept in production system
 - iii. Explain the concept of flow production and requirement must be fulfilled in flow production
 - iv. Apply the steps in flow production and analyze after and before condition of the application.
 - v. Explain the key factors in multi process operation and analyze after and before condition of the application.
 - vi. Apply the canban in production system
 - vii. Apply the concept of leveling production and compare with traditional production system
 - viii. Apply the concept of change over in production system
 - ix. Solve the problems related to quality assurance in production system
 - x. Apply standard operations in production system
- b. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

Course addresses/ supports ABET Student Outcome(s): 1, 2

Course Learning Outcomes mapped to Student Outcomes:

No	Course Learning Outcomes	ABET Student Outcomes
i.	Ability to explain just in time production system, its history and development and the steps to apply	1, 2
ii.	Ability to apply the 52 concept in production system	1, 2
iii.	Ability to explain the concept of flow production and requirement must be fulfilled in flow production	2
iv.	Ability to apply the steps in flow production and analyze after and before condition of the application.	1, 2
v.	Ability to explain the key factors in multi process operation and analyze after and before condition of the application.	2
vi.	Ability to apply the canban in production system	1, 2
vii.	Ability to apply the concept of leveling production and compare with traditional production system	1, 2
viii.	Ability to apply the concept of change over in production system	1, 2
ix.	Ability to solve the problems related to quality assurance in production system	1, 2
x.	Ability to apply standard operations in production system	1, 2

Brief list of topics to be covered

- i. Introduction to just in time production system
- ii. 5S concept
- iii. Flow Production
- iv. Multi Process Operation
- v. Canban
- vi. Leveling Production
- vii. Change Over
- viii. Quality Assurance
- ix. Standard Operations
- x. Jidoka
- xi. Maintenance
- xii. Safety
- xiii. Seru Production