KATALOG 2024/2025
PROGRAM STUDI SARJANA TEKNIK INDUSTRI

INDUSTRIAL ENGINEERING UNDERGRADUATE PROGRAM
CATALOG 2024-2025

JURUSAN TEKNIK INDUSTRI
FAKULTAS TEKNIK UNIVERSITAS ANDALAS
TAHUN 2024

DAFTAR ISI

Alamat

DEPARTEMEN TEKNIK INDUSTRI

Gedung Departemen Teknik Industri, Limau Manis Padang – 25163

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Sejarah

Departemen Teknik Industri dimulai dengan dibukanya Program Studi Sarjana (S1) Teknik Industri pada tahun 1994 dibawah Jurusan Teknik Mesin Universitas Andalas. Pada tahun 1996 berdasarkan Surat Keputusan Direktur Jenderal Pendidikan Tinggi Nomor 454/DIKTI/Kep/1996, Program Studi Sarjana (S1) Teknik Industri secara resmi berdiri. Mulai tahun 1997, Program Studi Sarjana (S1) Teknik Industri menerima mahasiswa melalui jalur UMPTN. Pada tahun 2005 berdasarkan Surat Keputusan Direktur Jenderal Pendidikan Tinggi Nomor 28/DIKTI/Kep/2005, tanggal 30 Mei 2005, Jurusan Teknik Industri resmi berdiri. Setelah resmi berdiri, Program Studi Sarjana (S1) Teknik Industri menjadi salah satu program studi yang banyak peminatnya. Seiring dengan berubahnya status Universitas Andalas menjadi PTN-BH, maka pada Juli 2022, Jurusan Teknik Industri berubah menjadi Departemen Teknik Industri.

Latar belakang pendirian TI-UNAND adalah adanya keinginan para pimpinan UNAND untuk memperluas peranannya dalam dunia pendidikan tinggi di Indonesia sesuai dengan visi, misi, tujuan, dan sasaran sebagaimana yang termaktub dalam Statuta Universitas Andalas Bab III Bagian Satu dan Bagian Dua Perpres No. 95 Tahun 2021 tentang PTN-BH UNAND terutama di bidang keilmuan Teknik Industri. Sejak awal berdiri, Program Studi Sarjana Teknik Industri UNAND menekankan proses pembelajarannya pada industri manufaktur.

Visi dan Misi

Visi

Sejalan dengan Visi Universitas Andalas, maka Departemen Teknik Industri Universitas Andalas mempunyai visi "Menjadi Departemen Teknik Industri bereputasi internasional".

Misi

Berdasarkan visi tersebut, maka disusun misi Departemen Teknik Industri Universitas Andalas sebagai berikut:

1. Mengembangkan Program Pendidikan Teknik Industri bereputasi internasional dalam bidang keilmuan teknik industri.
2. Melaksanakan pendidikan sarjana dan pascasarjana dalam bidang Teknik Industri agar menghasilkan lulusan yang berkualitas, profesional dan mampu bersaing di pasar global.
3. Melaksanakan penelitian terapan bidang Teknik Industri yang berkualitas internasional.
4. Mendukung peningkatan daya saing bangsa Indonesia melalui penciptaan karya dalam bidang keilmuan Teknik Industri yang bermanfaat bagi masyarakat.

Visi dan Misi tersebut dicapai dalam dua tahapan yaitu periode 2013 – 2020 dengan capaian reputasi regional, periode 2020 – 2030 dengan capaian reputasi internasional.

Akreditasi

Akreditasi Internasional dari *Accreditation Board for Engineering & Technology* (ABET), USA.

Akreditasi Nasional dengan peringkat "**Unggul**" dari Badan Akreditasi Nasional Perguruan Tinggi (BAN-PT).

No. SK. 6094/SK/BAN-PT/Akred-Itnl/S/IX/2020

Dosen

Prof. Ir. Alizar Hasan, M.S.I.E., M.Eng., Ph.D. (Professor/Profesor)
Ir. (ITB), M.S.I.E. (ITB), M.Eng. (Univ. of Leuven, Belgia), Ph.D. (USM, Malaysia)

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Drs. (ITB), M.T. (ITB), Dr. (ITB)

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Kurikulum

Profil Lulusan

Dua-tiga tahun setelah menyelesaikan studi (lulus), lulusan program studi diharapkan memiliki hal-hal berikut di awal karirnya:

1. Lulusan diharapkan memiliki profesionalisme dan peran kepemimpinan dalam organisasi industri atau organisasi lainnya yang relevan
2. Lulusan diharapkan memiliki peran sebagai sumber solusi yang efisien dan bernilai tambah untuk manfaat organisasi
3. Lulusan diharapkan telah menerapkan teknik-teknik perbaikan sistem terintegrasi untuk meraih keunggulan bersaing secara global

Capaian Pembelajaran

Program Studi Sarjana Teknik Industri mengharapkan mahasiswanya memiliki/ memenuhi 8 (delapan) capaian pembelajaran (CP) pada saat kelulusannya. Capaian Pembelajaran Program Studi telah dirumuskan berdasarkan standar lembaga akreditasi internasional (ABET, IABEE), Asosiasi Program Studi (BKSTI), jenjang kualifikasi KKNI dan SN-Dikti.

Berikut ini 8 (delapan) Capaian Pembelajaran Program Studi Sarjana Teknik Industri:

1. Kemampuan untuk mengidentifikasi, merumuskan dan menyelesaikan permasalahan keteknikan yang kompleks dengan menerapkan prinsip-prinsip keteknikan, sains dan matematik (ABET-1; IABEE-a,d; BKSTI-1,4; KKNI:KU-a)
2. Kemampuan untuk menerapkan rancangan keteknikan untuk menghasilkan solusi yang memenuhi kebutuhan yang telah ditentukan dengan pertimbangan kesehatan, keselamatan dan kesejahteraan umum dengan juga mempertimbangkan faktor global, budaya, sosial, lingkungan dan ekonomis (ABET-2; IABEE-b,e; BKSTI-2,5; KKNI:KU-a,c,d,e)
3. Kemampuan untuk berkomunikasi secara efektif dengan sekelompok hadirin/pendengar (ABET-3; IABEE-f; BKSTI-6; KKNI: KU-b,d,f,i)
4. Kemampuan untuk mengetahui tanggung jawab secara profesional dan etis dalam situasi keteknikan dan membuat penilaian berdasarkan informasi yang diperoleh yang harus mempertimbangkan dampak solusi keteknikan dalam konteks global, ekonomis, lingkungan dan social (ABET-4; IABEE-b,i; BKSTI-2,9; KKNI: S-a,b,d,e,f,g,h,i; KKNI: KU-c,e)
5. Kemampuan untuk berfungsi dalam suatu tim yang anggotanya bersama-sama memberikan kepemimpinan, menciptakan lingkungan kerjasama, menetapkan tujuan, merencanakan tugas-tugas dan memenuhi tujuan (ABET-5; IABEE-g,h; BKSTI-7,8; KKNI: S-b,c,e,i; KKNI: KU-b,f,g,h,i)
6. Kemampuan untuk mengembangkan dan mengadakan eksperimen yang tepat, menganalisa dan menyajikan data, dan menggunakan keputusan keteknikan untuk menarik kesimpulan (ABET-6; IABEE-c,e; BKSTI-3,5; KKNI:KU-e,i)
7. Kemampuan untuk memperoleh dan menerapkan pengetahuan baru yang dibutuhkan menggunakan cara belajar yang tepat (ABET-7; IABEE-j; BKSTI-10; KKNI: KU-d,h)
8. Kemampuan untuk menerapkan keterampilan dasar kewirausahaan (KKNI-S(j))

Informasi dalam kurung adalah pemenuhan Capaian Pembelajaran Program Studi/ Lulusan terhadap kriteria akreditasi internasional (ABET, IABEE), capaian pembelajaran BKSTI dan jenjang kualifikasi KKNI dalam SN-Dikti.

Pengkodean Matakuliah

Pengkodean mata kuliah pada Program Studi Sarjana Teknik Industri mengikuti ketentuan sebagai berikut:

1. Tiga karakter alfabet ditulis dalam huruf kapital menunjukkan kelompok mata kuliah. Untuk kelompok:
    a. Mata Kuliah Umum (MKWU) diberi kode MWU
    b. Mata Kuliah Wajib Universitas diberi kode AND
    c. Mata Kuliah Wajib Fakultas/Rumpun Ilmu diberi kode TEK
    d. Mata kuliah Program Studi Sarjana Teknik Industri diberi kode TIN.
2. Lima karakter numerik menunjukkan jenjang Pendidikan berdasarkan Kerangka Kualifikasi Nasional Indonesia (KKNI), semester, dan nomor urut mata kuliah sebagai berikut:
    a. Angka pertama menunjukkan level KKNI, yaitu angka 6 untuk Program Sarjana
    b. Angka kedua menunjukkan semester dalam rancangan kurikulum, yaitu:
        (1) Angka 0 untuk semester ganjil dan genap
        (2) Angka 1 untuk semester ganjil; dan
        (3) Angka 2 untuk semester genap.
    c. Angka ketiga menunjukkan kelompok sifatnya, yaitu:
        (1) Angka 1 untuk mata kuliah wajib prodi, fakultas maupun institusional; dan
        (2) Angka 2 untuk mata kuliah pilihan
    d. Angka keempat dan kelima menunjukkan nomor urut mata kuliah sesuai dengan huruf c

Distribusi Matakuliah

Semester I					**Semester II**				
No	**Kode MK**	**Matakuliah**	**SKS**		**No**	**Kode MK**	**Matakuliah**	**SKS**	
1	MWU60101	Agama	2		1	MWU60102	Pancasila	2	
2	MWU60104	Bahasa Indonesia	2		2	MWU60103	Kewarganegaraan	2	
3	TIN61101	Kalkulus I	4		3	TEK60101	Bahasa Inggris	2	
4	TIN61102	Fisika Dasar I	4	/P	4	TIN62107	Kalkulus II	4	
5	TIN61103	Kimia Dasar	3	/P	5	TIN62108	Fisika Dasar II	4	/P
6	TIN61104	Pengantar Teknik Industri	2		6	TIN62109	Programa Komputer	3	/P
7	TIN61105	Menggambar Teknik	2	/T	7	TIN62110	Mekanika Teknik	2	
8	TIN61106	Pengetahuan Lingkungan	2		8	TEK60102	Etika Profesi	2	
		Jumlah SKS	**21**				**Jumlah SKS**	**21**	
Semester III					**Semester IV**				
No	**Kode MK**	**Matakuliah**	**SKS**		**No**	**Kode MK**	**Matakuliah**	**SKS**	
1	TIN61111	Matriks dan Ruang Vektor	3		1	TIN62118	Kalkulus Peubah Banyak	3	
2	TIN61112	Material Teknik	2	/P	2	TIN62119	Rekayasa dan Perancangan Data	3	

3	TIN61113	Proses Manufaktur	3	/P	3	TIN62120	Penelitian Operasional I	3	/T
4	TIN61114	Statistika Industri I	3	/T	4	TIN62121	Statistika Industri II	3	/T
5	TIN61115	Perancangan dan Pengukuran Sistem Kerja	4		5	TIN62122	Analisis dan Estimasi Biaya	2	
6	TIN61116	Organisasi dan Manajemen Perusahaan Industri	3		6	TIN62123	Perencanaan dan Pengendalian Produksi	3	
7	TIN61117	Pengetahuan Energi	2		7	TIN62124	Sistem Rantai Pasok	3	
		Jumlah SKS	**20**				**Jumlah SKS**	**20**	

Semester V (*Hak Belajar Dalam/ Luar PT (Cross Enrollment/ Program Credit Earning/Transfer*)

Semester VI (*Hak Belajar Dalam/ Luar PT (Cross Enrollment/ Program Credit Earning/Transfer*)

No	**Kode MK**	**Matakuliah**	**SKS**		**No**	**Kode MK**	**Matakuliah**	**SKS**	
1	TEK60103	Ekonomi Teknik	2		1	TIN62131	Perancangan Tata Letak Fasilitas	3	/P
2	TIN61125	Penelitian Operasional II	3	/T	2	TIN62132	Analisis dan Perancangan Perusahaan	2	
3	TIN61126	Keselamatan, Kesehatan dan Lingkungan Kerja	2		3	TIN62133	Simulasi Sistem	3	/T
4	TIN61127	Analisis dan Perancangan Sistem Informasi	3	/P	4	TIN60134	Metodologi Penelitian	2	
5	TIN61128	Perancangan Teknik Industri	2	(P)	5	TIN62135	Perancangan dan Pengembangan Produk	3	/T
6	TIN61129	Pengendalian dan Penjaminan Mutu	3		6	TIN62136	Elektronika dan Otomasi Industri	2	
7	TIN61130	Pemodelan Sistem	2		7	AND60101	Kuliah Kerja Nyata (KKN)	4	
8	AND60102	Kewirausahaan	3		8	TIN60137	Kerja Praktek	2	
		Jumlah SKS	**20**				**Jumlah SKS**	**21**	

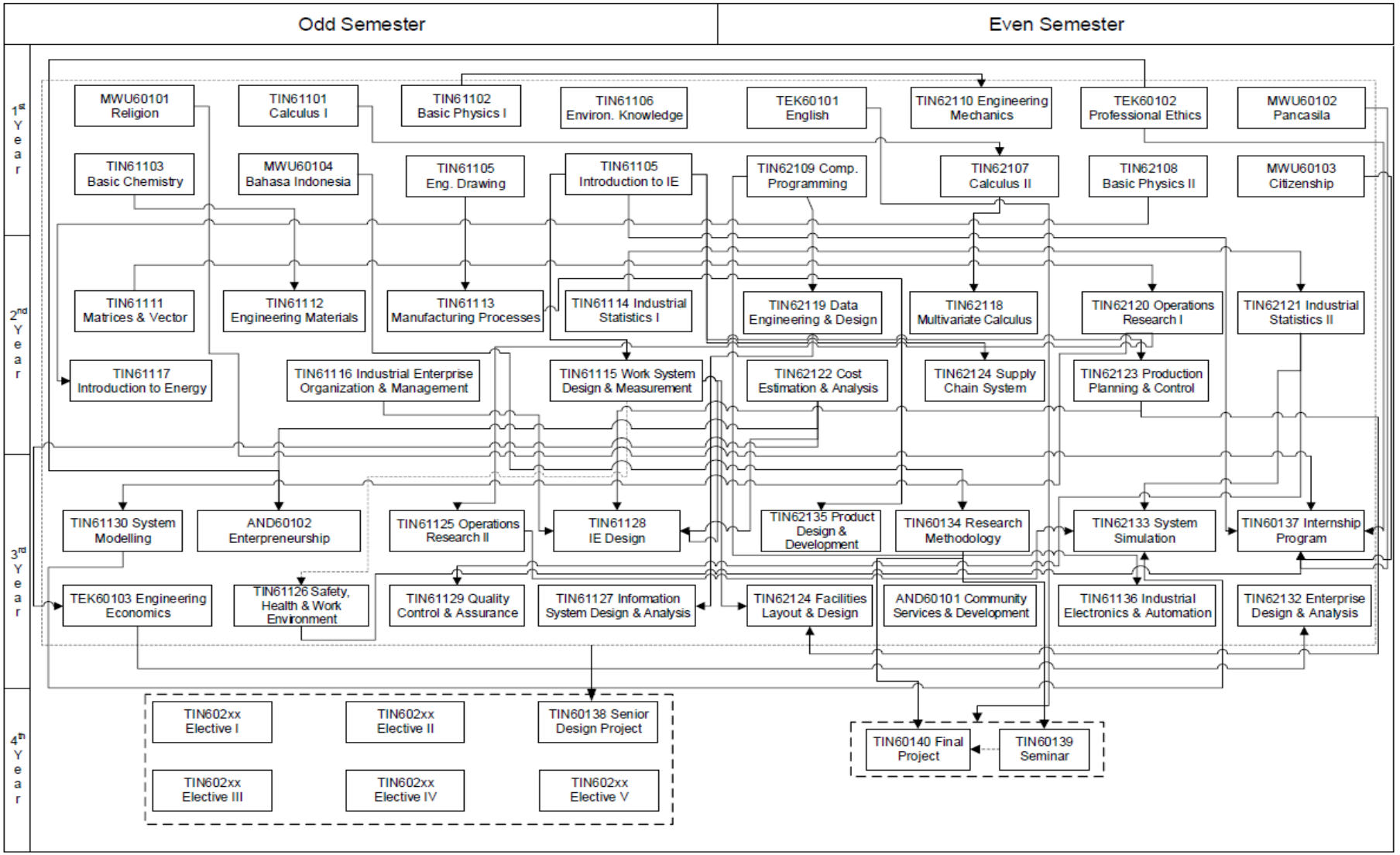
Semester VII (*Hak Belajar Luar Prodi dalam PT (Cross Enrollment) / Luar PT*)

Semester VIII (*Hak Belajar Luar PT*)

No	Kode MK	Matakuliah	SKS		No	Kode MK	Matakuliah	SKS	
1	TIN602xx	Pilihan Jalur / Bebas I	3		1	TIN60139	Seminar	2	
2	TIN602xx	Pilihan Jalur / Bebas II	3		2	TIN60140	Tugas Akhir	4	
3	TIN602xx	Pilihan Jalur / Bebas III	3						
4	TIN602xx	Pilihan Jalur / Bebas IV	3						
5	TIN602xx	Pilihan Jalur / Bebas V	3						
6	TIN60138	Proyek Perancangan	2	(T)					
		Jumlah SKS	**17**				**Jumlah SKS**	**6**	
					Minimal Jumlah SKS Keseluruhan			**146**	

Catatan: Hak Belajar Luar PT: Magang Bersertifikat, Membangun Desa, Kegiatan Wirausaha, Asistensi Penelitian/Riset, Studi/Proyek Independen, Proyek Kemanusiaan, Asistensi Mengajar, Penanggulangan Bencana).
/P: Teori dan Praktek, (P): Praktek, /T: Teori dan Tugas

Peta Matakuliah



Gambar 1. Peta Kurikulum 2021-2026 Program Studi Sarjana Teknik Industri

Peta Pencapaian Capaian Pembelajaran dari Mata Kuliah

No	Kurikulum 2021 Sarjana TI Universitas Andalas		Capaian Pembelajaran Program Studi (CP)							
		sks	CP-1	CP-2	CP-3	CP-4	CP-5	CP-6	CP-7	CP-8
1	Kalkulus I	4	X							
2	Kalkulus II	4	X							
3	Kalkulus Peubah Banyak	3	X							
4	Matriks dan Ruang Vektor	3	X							
5	Statistika Industri I	3	X	X				X		
6	Statistika Industri II	3	X	X				X		
7	Fisika Dasar I / P	4	X							
8	Fisika Dasar II / P	4	X							
9	Kimia Dasar / P	3	X							
10	Pendidikan Agama	2				X				
11	Pancasila	2				X				
12	Kewarganegaraan	2				X				
13	Bahasa Indonesia	2			X					
14	Bahasa Inggris	2			X		X			
15	Etika Profesi	2				X			X	X
16	KKN	4			X	X	X			X
17	Pengetahuan Lingkungan	2	X	X		X				X
18	Menggambar Teknik	2		X						
19	Programa Komputer	3	X	X						
20	Mekanika Teknik	2	X							
21	Material Teknik	2	X	X				X		
22	Elektronika dan Otomasi Industri	2	X	X						
23	Organisasi dan Manajemen Perusahaan Industri	3		X	X	X	X		X	
24	Analisis dan Estimasi Biaya	2	X	X		X				X
25	Pengantar Teknik Industri	2	X			X			X	
26	Ekonomi Teknik	2	X	X		X	X			X
27	Simulasi Sistem	3	X	X	X			X		
28	Perancangan dan Pengukuran Sistem Kerja	4	X	X		X		X		
29	Penelitian Operasional I	3	X				X		X	
30	Proses Manufaktur	3	X	X						
31	Pengendalian dan Penjaminan Mutu	3	X	X		X		X	X	
32	Perencanaan dan Pengendalian Produksi	3	X	X	X					
33	Penelitian Operasional II	3	X				X			
34	Pemodelan Sistem	2	X			X			X	
35	Sistem Rantai Pasok	3	X	X		X			X	
36	Keselamatan, Kesehatan dan Lingkungan Kerja	2		X	X	X			X	
37	Perancangan Teknik Industri	2	X	X	X			X		
38	Rekayasa dan Perancangan Data	3	X	X		X	X	X	X	
39	Pengetahuan Energi	2		X		X			X	X

40	Analisis dan Perancangan Sistem Informasi	3	X	X		X	X	X	X	
41	Perancangan Tata Letak Fasilitas	3	X	X	X	X	X			
42	Analisis dan Perancangan Perusahaan	2		X		X				X
43	Proyek Perancangan	2		X	X	X	X			
44	Kewirausahaan	3			X	X	X		X	X
45	Perancangan dan Pengembangan Produk	3		X	X	X	X		X	
46	Kerja Praktek	2			X	X	X			
47	Metodologi Penelitian	2			X				X	
48	Seminar	2	X		X	X	X		X	
49	Tugas Akhir	4	X	X	X	X	X		X	

Deskripsi Matakuliah

1. **Kelompok Pengetahuan Umum (28 sks)**
   - MWU60101 Agama (Religion) (2 sks)
     Options:
     - Islam: Introducing to Islamic Education, the Source of Religion, Morality, Islamic Law, Islam and contemporary Issues.
     - Other religions: to be determined by each religion
   - MWU60102 Pancasila (Pancasila) (2 sks)
     Pancasila 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.
   - MWU60103 Kewarganegaraan (Citizenship) (2 sks)
     Citizenship discuss about nation and nationalism, constitution, human right, archipelago concept, geopolitics and Indonesian strategies
   - MWU60104 Bahasa Indonesia (2 sks)
     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
   - TEK60101 Bahasa Inggris (English) (2 sks)
     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
   - TEK60102 Etika Profesi (Professional Ethics) (2 sks)
     Professionalism and Codes of Ethics, Understanding Ethical Problems, Ethical Problem-Solving Techniques, Risk, Safety and Accidents, The rights and Responsibilities of Engineers, Ethics in Research and Experimentation, Doing the Right Things
   - TIN61106 Pengetahuan Lingkungan (Environmental Knowledge) (2 sks)
     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
   - TIN61115 Organisasi dan Manajemen Perusahaan Industri (Industrial Enterprise Management and Organization) (3 sks)
     Leadership, Teamwork, and Organization; Leadership, Organizational structure, and development, Teamwork, Communication, Internal corporate culture and external global culture, Management, Resource and Responsibility; Resources, Organizational responsibilities, Ethics in the practice of engineering management
   - TIN 62122 Analisis dan Estimasi Biaya (Cost Estimation and Analysis) (2 sks)
     Classification of Cost; Understand costs to properly compare engineering alternatives, First cost, Fixed and variable cost, Incremental and marginal cost, Sunk cost, Accounting and Cost Accounting; General accounting, Cost accounting, Allocation of overhead, Cost estimating
   - AND60101 Kuliah Kerja Nyata (Community Service and Development) (KKN) (4 sks)
     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.

- AND60102 Kewirausahaan (Entrepreneurship) (3 sks)
  Organizational Issues, Customer Focus, Leadership, Teamwork, and Organization, Business Processes, 1. Proposal types, 2. Feasibility Analysis; Payback period, discounted payback period, internal rate of return, external rate of return
- TIN60134 Metodologi Penelitian (Research Methodology) (2 sks)
  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

2. Kelompok Matematika dan Ilmu Sains Dasar (31 sks)

- TIN61101 Kalkulus I (Calculus I) (4 sks)
  Differentiation of algebraic functions, Differentiation transcendental functions, Differentials, Indefinite integrals, Definite integrals.
- TIN62107 Kalkulus II (Calculus II) (4 sks)
  Methods of integration, parametric equations, Polar coordinates, Hyperbolic functions, Series.
- TIN61111 Matriks dan Ruang Vektor (Matrices and Vectors) (3 sks)
  Systems of Linear Equations and Matrices, Determinants, Linear Transformations, Eigenvalues and Eigenvectors.
- TIN62118 Kalkulus Peubah Banyak (Multivariate Calculus) (3 sks)
  Partial differentiation, Functions of several variables, multiple integrals, Line integrals, Surface integrals, Stokes Theorem.
- TIN61102 Fisika Dasar I (Basic Physics I) (4 sks)
  Kinematics, Dynamics, Energy, Momentum, Thermodynamics.
- TIN62108 FIsika Dasar II (Basic Physics II) (4 sks)
  Electric Charge And Electric Field, Gauss's Law, Electric Potential, Capacitance, Dielectrics, Electric Energy Storage, Electric Currents And Resistance, Dc Circuits, Magnetism, Sources Of Magnetic Field, Electromagnetic Induction And Faraday's Law, Inductance, Electromagnetic Oscillations, And Ac Circuits, Maxwell's Equations And Electromagnetic Waves.
- TIN61103 Kimia Dasar (Basic Chemistry) (3 sks)
  State of Matters, Periodic Tables, Chemical Reactions, Atomic Structure, Chemical bonding, Molecular structure, Properties of gases, liquids, solutions and solids
- TIN61114 Statistika Industri I (Industrial Statistics I) (3 sks)
  Descriptive Statistics, Probability, Discrete Random Variables & Probability Distributions, Continuous Random Variables & Probability Distributions
- TIN62121 Statistika Industri II (Industrial Statistics II) (3 sks)
  Point Estimation, Statistical intervals, Test of Hypotheses, Simple Linear Regression and Correlation, Nonlinear & Multiple Regression, Nonparametric Statistics

3. Kelompok Ilmu Teknik Umum dan Teknik Industri (73 sks)

I. Teknik Umum (16 sks)

- TIN61105 Menggambar Teknik (Engineering Drawing) (2 sks)
  Engineering Design including 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
- TIN62110 Mekanika Teknik (Engineering Mechanics) (2 sks)
  Rigid body static, structures, center of gravity and moment of inertia.
- TIN62109 Programa Komputer (Computer Programming) (3 sks)
  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, Data types, Forms/reports design, Program specifications, Programming techniques
- TIN61112 Material Teknik (Engineering Material) (2 sks)
  Fundamentals of Materials; Types of Engineering Materials: Metals, Polymers, Ceramics, and Composites, Atomic and Crystalline Structure, Mechanical Properties of Materials, Physical Properties of Materials: Thermal, Electrical, Biological.
- TIN61113 Proses Manufaktur (Manufacturing Processes) (3 sks)
  Introduction to Solidification-based Manufacturing Processes; Metal Solidification, Fluid Flow, and Heat Transfer, Metal Casting: Expendable and Permanent Mold Processes, Design for Metal Casting, Casting Quality and Inspection Methods, Polymer Processing: Thermoplastics, Thermosets and Polymer-Matrix Composites Processing, Design for Polymer Processing, Quality Considerations for Processed Polymer Parts, Introduction to Material Removal Processes; Theory of Metal Cutting, Conventional Machining Processes: Turning, Milling, Drilling and Related Operations and Tools, Abrasive Machining Processes, Non-traditional Machining Processes, Machinability and Quality Considerations.
- TIN61117 Pengetahuan Energi (Introduction to Energy) (2 sks)
  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
- TIN62136 Elektronika dan Otomasi Industri (Industrial Electronics and Automation) (2 sks)
  Automation and Systems Integration, Numerical Control, Programmable Logical Control, etc.

II. Ilmu dan Desain Teknik Industri (57 sks)

- TIN61104 Pengantar Teknik Industri (Introduction to Industrial Engineering) (2 sks)
  Definition, History and Development of Industrial Engineering Discipline, The profession and Industrial Engineering Association, Engineering Code of Ethics, Intro to IE-UNAND Curriculum, Intro to Work Design and Measurement, Ergonomics and Human Factors, Safety, Operations Engineering & Management, Quality & Reliability Engineering, Facilities Engineering and Energy Management, Operations Research and Analysis, Engineering Economics Analysis, Supply Chain Management, Engineering Management, Information Engineering, Design and Manufacturing Engineering, Product Design & Development.

- TIN61115 Perancangan dan Pengukuran Sistem Kerja (Work System Design and Measurement) (4 sks)
  Uses of Standards, Time and Motion Study, Pre-Determined Time Systems, Work Sampling, Learning Curve, Workstation Design, Ergonomic Basics; Focuses of ergonomics, Ergonomics and its areas of application in a work system, Ergonomic interventions, Effectiveness and cost effectiveness of ergonomics, Anthropometric Principles in Workspace and Equipment Design; Basic body mechanics, Risk factors for musculoskeletal disorders, Designing for a population of users, Sources of human variability, Anthropometry and its uses in ergonomics, Principles of applied anthropometry in ergonomics, Application of anthropometry in design, Designing for everyone, Worker Capacity Analysis, Analysis Tools, Wage Surveys
- TIN62119 Rekayasa dan Perancangan Data (Data Design and Engineering) (3 sks)
  Data Processing Overview, Data Base Concepts, Logical Data Organization, Physical Data Organization, Storage and Processing, Data Analytics; Machine Learning Concepts, Data preparation, Feature identification and evaluation, Model evaluation, Descriptive analysis, Clustering models, Classification models, Predictive analytics models, Prescriptive analytics
- TIN62120 Penelitian Operasional I (Operations Research I) (3 sks)
  Introduction to Operations Research, Linear Programming (LP); LP applications, LP modeling techniques, LP assumptions, Simplex method, Degenerate and unbounded solutions, Post-optimality and sensitivity analysis, Duality theory, Revised simplex method, Dual simplex method, Transportation Problem, Linear Assignment Problem
- TIN62123 Perencanaan dan Pengendalian Produksi (Production Planning and Control) (3 sks)
  Storage/warehouse/distribution functions, Forecasting, Aggregate planning, Planning and Control for Manufacturing Systems/Projects, Production Scheduling, Inventory Management & Control, Capacity Management, Materials Requirements Planning, Line Balancing, Operational Metrics, Manufacturing Systems
- TIN62124 Sistem Rantai Pasok (Supply Chain System) (3 sks)
  Supply Chain Management Fundamentals, Building Competitive Operations, Planning, and Logistics, Reverse logistics, Managing Product Flow; Inventory control methodologies, Material handling systems, Transportation management, Managing Supplier Relationships; Insourcing vs. outsourcing decisions, Strategic importance of purchasing and supplier relationships, Supplier scorecard systems, Managing the supplier lifecycle, Customer data, Selection of and understanding Tier 2, 3, etc. suppliers, Operational Metrics
- TIN61125 Penelitian Operasional II (Operation Research II) (3 sks)
  Network Flows and Optimization, Goal programming, Deterministic Dynamic Programming, Decision Analysis and Game Theory, Modeling under Uncertainty; Stochastic processes, Markov chains, Queuing Systems
- TIN61126 Keselamatan, Kesehatan dan Lingkungan Kerja (Safety, Health and Work Environment) (2 sks)
  Perspective and Overview; History of safety and health movement, Definition of hazards and accident statistics, Theories of accident causation, Effects on global competition on safety and health practice and regulations, Indonesian Laws and Regulations; Product safety and liability (safety in the courtroom), Consumer product safety commission, Workers' compensation, The OSHA Act, standards, and liability, OSHA record keeping system, Hazard communication standard (DOT regulations), Hazard Recognition, Evaluation and Control, Safety and Health Management; Ethics and safety, Emergency planning, Accident investigation and reporting, Corporate safety culture and behavior-based safety programs, Risk assessment/hazard analysis, Preliminary hazard analysis, Accidents and safety

- TIN61127 Analisis dan Perancangan Sistem Informasi (Information System Design and Analysis) (3 sks)
  Differentiating Data and Information, Systems Concepts, Information Requirements for Organizations, Designing Information Outputs, System Analysis, System Design, System Evaluation & Justification, Controls, Forms, Programs, and Procedures, System Implementation, Management Considerations for the Information System
- TIN61128 Perancangan Teknik Industri (Industrial Engineering Design) (Lab activity, 2 sks)
  Time and Motion Study, Learning Curve, Line Balancing, Workstation Design, Worker Capacity Analysis, Forecasting, Aggregate planning, Production Scheduling, Capacity Management, Materials Requirements Planning
- TEK60103 Ekonomi Teknik (Engineering Economics) (2 sks)
  Classification of Cost, Interest and Interest Formulas, Cash Flow Analysis, Financial Decision Making Among Alternatives, Replacement Analysis, Break-Even and Minimum Cost Analysis, Depreciation and Depreciation Accounting, Income Taxes in Economic Analysis, Estimating Economic Elements
- TIN61129 Pengendalian dan Penjaminan Mutu (Quality Control and Assurance) (3 sks)
  Quality Concepts, Control Charts and Process Capability; Variable control charts, Attribute control charts, Lot acceptance sampling; Attributes, Variables, Process/lot fraction defective, Mean or standard deviation of a process/Lot, Rectifying inspection/ auditing
- TIN61130 Pemodelan Sistem (System Modelling) (2 sks)
  System concepts, System thinking, Identify need, Definition of a problem, Gathering of information & data, Modelling approach.
- TIN62131 Perancangan Tata Letak Fasilitas (Facilities Layout Design) (3 sks)
  Facilities Location, Facilities Sizing, Facilities Layout; Basic layout types, Data requirements, Traditional approaches, Basic algorithms, Evaluation of Alternative Layouts, Material Handling, Storage, Warehousing, and Distribution, Plant and Facilities Engineering
- TIN62132 Analisis dan Perancangan Perusahaan (Enterprise Design and Analysis) (2 sks)
  Job Analysis, Wage Surveys, Classification of Cost, Cash Flow Analysis, Customer Focus, Leadership, Teamwork, and Organization, Business Processes, Resource and Responsibility, Project Management, Capacity Management, Engineering Design
- TIN62133 Simulasi Sistem (System Simulation) (3 sks)
  Fundamentals of Simulation, Random number generation, Sampling from probability distributions, Simulation methodology, Monte Carlo simulation, Discrete-Event System Simulation, Queuing Systems, Fundamentals of Systems Dynamic
- TIN62135 Perancangan dan Pengembangan Produk (Product Design and Development) (3 sks)
  Operations Planning, Product Lifecycle Management, Design Process, Design Process Steps, Design Project, Economic Decision Making/Cost Evaluation, Planning & Scheduling, Risk and Opportunity Management, Metrics for Design & Development, Program Leadership, Management & Control, Design for Manufacturability, Design for Cost, Design for Six Sigma
- TIN60137 Kerja Praktek (Internship Program) (2 sks)
  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

- TIN60138 Proyek Perancangan (Senior Design Project) (2 sks)
  (1) The project should include analytical investigation (both quantitative and qualitative) techniques. The project should involve solving a significant problem at a client site, product

or process development for a societal need, or can be part of a research effort but must contain significant design content (thus it cannot be basic research).

(2) The project must allow the student to apply specific industrial engineering skills learned in required courses in the curriculum.

(3) The project must prepare the student for engineering practice by incorporating engineering standards and realistic constraints that include most of the following considerations: Economic, Sustainability, Ethical, Social, Environmental, Manufacturability, Health and Safety, Political. These factors should be addressed and documented (as appropriate) in any required project communication.

(4) The project should be done with a team of students although exceptions can be made to this requirement.

(5) The project must result in specific deliverables to a client or other project sponsor (may be a course instructor).

(6) The project must require formal communication of results through both a written report as well as some type of presentation to stakeholders (formal presentation, poster, video, etc.)

- TIN60139 Seminar (2 sks)
  This course is delivered to prepare the final project proposals of the students. It focuses on problem solving which includes problem identification and formulation, literature review, method selection, designing research methodology, and reporting orally as well as in writing.
- TIN60140 Tugas Akhir (Final Project) (4 sks)
  This course is the academic activity of students in the form of research. Students are expected to produce monumental scientific work as one of requirements to get their degrees. It is a continuation of students' final project proposals and emphasizes on finding alternative solutions, defining criteria to find the best solution, determining the best solution based the criteria, analyze the consequence of the selected solution, and reporting orally as well as in writing.

Implementasi Hak Belajar Maksimum 3 Semester di Luar Program Studi

Implementasi Kebijakan Program Merdeka Belajar – Kampus Merdeka (MBKM) Universitas Andalas khususnya dan Program Studi Sarjana Teknik Industri mengacu kepada Undang-Undang Nomor 20 Tahun 2003, tentang Sistem Pendidikan Nasional, Undang-Undang Nomor 12 Tahun 2012, tentang Pendidikan Tinggi, Peraturan Pemerintah Nomor 04 Tahun 2014, tentang Penyelenggaraan Pendidikan Tinggi dan Pengelolaan Perguruan Tinggi, Peraturan Presiden nomor 8 tahun 2012, tentang KKNI, Permendikbud No. 3 Tahun 2020 tentang Standar Nasional Pendidikan Dikti, Peraturan Rektor No. 14 Tahun 2020 tentang Peraturan Akademik Program Sarjana Universitas Andalas, dan Peraturan Rektor No. 15 Tahun 2020 tentang Pengembangan Kurikulum dalam Program Merdeka Belajar – Kampus Merdeka (MBKM) Universitas Andalas.

Hak belajar luar program studi bagi mahasiswa Program Studi Sarjana Teknik Industri diberikan mulai Semester V atau VI. Pelaksanaan program Merdeka Belajar – Kampus Merdeka saat ini dibagi dalam 2 (dua) semester yaitu:

1. Hak Belajar Luar Program Studi Luar Perguruan Tinggi (PT); Program Pertukaran Pelajar (*Credit Earning*)
   Mahasiswa mengambil mata kuliah pada perguruan tinggi lain yang menjadi mitra kerjasama baik di dalam maupun di luar negeri melalui Program *Credit Earning* dengan sistem ekuivalensi mata kuliah dengan beban setara 20-21 sks.

2. Hak Belajar Luar Program Studi Dalam atau Luar Perguruan Tinggi (PT):

   Mahasiswa mengikuti salah satu dari program-program berikut ini baik di dalam maupun di luar perguruan tinggi dengan beban setara 20-21 sks.

   a. Program *Cross Enrollment* pada Program Studi lain dengan sistem pengakuan mata kuliah pada program studi lain tersebut sebagai mata kuliah pilihan dan ekuivalensi mata kuliah pada program studi dengan beban setara 20-21 sks.
   b. Program Magang bersertifikat dengan pengakuan mata kuliah program studi sebagai berikut:

AND602xx	Mata Kuliah Pilihan Bebas (MBKM)	14 sks
	Seminar/ Kerja Praktek/ MK Pilihan Bebas	2-3 sks
	Tugas Akhir/ MK Pilihan Bebas	3-4 sks
	Total	20-21 sks

   c. Program Mahasiswa Membangun Desa dengan pengakuan mata kuliah program studi sebagai berikut:

AND602xx	Mata Kuliah Pilihan Bebas (MBKM)	11 sks
AND60101	Kuliah Kerja Nyata	4 sks
	Seminar/ MK Pilihan Bebas	2-3 sks
	Tugas Akhir/ MK Pilihan Bebas	3-4 sks
	Total	20-21 sks

   d. Program Mahasiswa Melakukan Wirausaha dengan pengakuan mata kuliah program studi sebagai berikut:

AND602xx	Mata Kuliah Pilihan Bebas (MBKM)	15 sks
	Seminar/ MK Pilihan Bebas	2-3 sks
	Tugas Akhir/ MK Pilihan Bebas	3-4 sks
	Total	20-21 sks

e. Program Mahasiswa Studi Independen dengan pengakuan mata kuliah program studi sebagai berikut:

AND602xx	Mata Kuliah Pilihan Bebas (MBKM)	14 sks
	Seminar/ MK Pilihan Bebas	2-3 sks
	Tugas Akhir/ MK Pilihan Bebas	3-4 sks
	Total	20-21 sks

Pengakuan/ rekognisi mata kuliah program studi dari program-program Merdeka Belajar – Kampus Merdeka tersebut dilakukan oleh Unit Gugus Kendali Mutu (GKM) bersama Tim Kurikulum Program Studi yang nantinya ditetapkan dengan Surat Keputusan Dekan Fakultas Teknik.