

Material & Process

DESCRIPTION OF COURSE UNIT

Program Studi Sarjana (S1) Desain Produk
Bachelor of Industrial Design (BOLD)
2018-2023



Description of Course Unit
according to the ECTS User's Guide 2015

Course unit title	Material and Process
Course unit code	DP184413
Type of course unit	Compulsory
Level of course unit	First cycle Bachelor
Year of study when the course unit is delivered	2 nd year
Semester/trimester when the course unit is delivered	4 th semester
Number of ECTS credits allocated	6,4 ECTS Credits
Name of lecturer	Prof.Dr., Ir. Bambang Iskandriawan, M.Eng.
Learning outcomes of the course unit	Students can comprehensively explain the criteria for: 1. Material properties and material selection in product design. 2. Manufacturing processes. 3. Joints. 4. Springs. 5. Shafts, pins, and bearings. 6. Power screws. 7. Mechanical transmission. 8. Structure and construction. 9. Systems/sub-systems in products, sustainable design.
Mode of delivery	face-to-face
Prerequisites and co-requisites	-
Course content	This course serves as a supporting subject for design courses, especially focusing on material and process aspects. 1) Material properties: density, Young's modulus, strength, and cost. 2) Material properties: elongation, toughness, resistivity, energy content, maximum service temperature, and recycling. 3) Material selection for product design. 4) Molding process in the production of product components. 5) Casting process in the production of product components.

	6) Bulk forming process in the production of product components. 7) Sheet forming process in the production of product components. 8) Rapid prototyping process, lay-up method, and powder methods in the production of product components. 9) Use and selection of joints in product design. 10) Use and selection of springs in product design. 11) Use and selection of shafts, pins, and bearings in product design. 12) Use and selection of power screws in product design. 13) Use and selection of mechanical transmission (belt, chain, and gear) in product design. 14) Use and selection of structure and construction in product design. 15) Concept and implementation of Sustainable Design
Recommended or required reading and other learning resources/tools	<ul style="list-style-type: none"> • Asbhy, Mike and Kara Johnson. 2010. Materials and Design-The Art and Science of Material Selection in Product Design. Burlington: Butterworth-Heinemann • Cross, Nigel. 2000. Engineering Design Methods: Strategies for Product Design, 3rd edition, New York: John Wiley & Sons. Ltd • Mott, R.L., 2009, "Elemen-elemen Mesin dalam Perancangan Elemen Mesin Terpadu", Penerbit Andi, Buku 1 dan 2 • Karl T. Ulrich and Steven D. Eppinger, 2015, Product Design And Development (6th Edition) • Daniel F. Cuffaro, 2014, The Industrial Design Reference + Specification Book
Planned learning activities and teaching methods	Case Method; Team Based Learning
Language of instruction	Indonesia
Assessment methods and criteria	Assignment, Project, Midterm Evaluation and Final Evaluation

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DP184413

Material dan Proses

Material and Process

3 credits

Coordinator: Prof.Dr., Ir. Bambang Iskandriawan, M.Eng.

Course Form

Course Type

Minimum Passing Grade

:

:

:

Tidak Ada

C

Course Description

Sebuah mata kuliah penunjang mata kuliah perancangan khususnya dari aspek bahan termasuk karakteristiknya dan proses manufaktur pembuatan produk berikut komponen-komponennya.

A supporting course for design courses in industrial design , especially from the material aspect, including its characteristics and the manufacturing process for making products and their components.

LO

CLO

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Learning Outcomes Charged by the Course

Mohon untuk mengecek kurikulum yang lain juga pada pilihan di bawah ini (lalu klik **Tampilkan**). Kemudian mohon pastikan centang CPL telah sesuai dengan yang dibutuhkan oleh CPMK.

Curriculum:

Kurikulum 2018 S-1 Desain Produk

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No.	Description
<input type="checkbox"/>	1. Mampu menyusun konsep desain dengan mengidentifikasi sumber masalah, menganalisis, dan mensintesis kebutuhan dengan mempertimbangkan aspek estetika, kenyamanan dan keselamatan pengguna pada suatu produk <i>Able to develop design concepts by identifying problem sources, analyzing, and synthesizing needs by considering aesthetic, comfort and user safety aspects of a product</i>
<input type="checkbox"/>	2. Mampu merancang sistem produk dan benda produk berdasarkan penguasaan metoda desain, cara produksi dan sistem distribusi, untuk menghasilkan produk yang dapat dipertanggungjawabkan terhadap kaldah desain, dampak pada lingkungan hidup, dan isu-isu sosial budaya <i>Able to design product systems and product objects based on mastery of design methods, production methods and distribution systems, to produce products that can be accounted for by design principles, impacts on the environment, and socio-cultural issues</i>
<input checked="" type="checkbox"/>	3. Mampu membuat model untuk menyelesaikan masalah desain yang kompleks secara kreatif berdasarkan prinsip-prinsip desain dan rekayasa, dengan mempertimbangkan faktor ekonomi, keamanan, keselamatan, dan kelestarian lingkungan <i>Able to create models to solve complex design problems creatively based on design and engineering principles, taking into account economic, security, safety, and environmental sustainability factors</i>
<input type="checkbox"/>	4. Melakukan kolaborasi dalam bidang kerja yang multi disiplin dengan memanfaatkan pengetahuan dan kemampuan desainnya <i>Collaborating in multi-disciplinary work areas by utilizing design knowledge and skills</i>
<input type="checkbox"/>	5. Memahami konsep teoretis desain: 1. fungsi, 2. estetika, 3. ekonomi, 4. sosial dan, 5. teknologi secara umum <i>Understand the theoretical concepts of design: 1. function, 2. aesthetics, 3. economy, 4. social and, 5. technology in general</i>
<input type="checkbox"/>	6. Ketramampilan presentasi lisan, tulisan dan multimedia dan teknologi presentasi secara umum <i>Oral, written and multimedia presentation skills and general presentation technology</i>
<input type="checkbox"/>	7. Ketramampilan rekabentuk dan visualisasi 2 dan 3 matra secara mendalam <i>Design skills, 2 and 3 dimension visualization in depth</i>
<input type="checkbox"/>	8. Prinsip dan metodologi desain secara mendalam <i>Design principles and methodologies</i>
<input type="checkbox"/>	9. Konsep user centered design secara mendalam <i>The concept of user centered design in depth</i>
<input type="checkbox"/>	10. Sejarah dan perkembangan desain produk secara mendalam <i>The history and development of product design in depth</i>
<input type="checkbox"/>	11. Wawasan budaya dan perkembangan tren secara mendalam <i>Insight into culture and trend developments in depth</i>
<input checked="" type="checkbox"/>	12. Prinsip dan isu terkini dalam teknologi manufaktur secara umum <i>Current principles and issues in manufacturing technology in general</i>
<input type="checkbox"/>	13. Bisnis dan pemasaran, kewirausahaan, kode etik dan HAKI (Hak atas Kekayaan Intelektual) secara umum <i>Business and marketing, entrepreneurship, code of ethics and IPR (Intellectual Property Rights) in general</i>
<input type="checkbox"/>	14. Konsep dan prinsip pelestarian lingkungan secara umum <i>Environmental conservation concepts and principles in general</i>

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ADVANCING HUMANITY

ITS

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DP184413

Material dan Proses

Material and Process

3 credits

Coordinator: Prof.Dr., Ir. Bambang Iskandriawan, M.Eng.

Course Form

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Course Type

: Tidak Ada

Minimum Passing Grade

: C

Course Description

Sebuah mata kuliah penunjang mata kuliah perancangan khususnya dari aspek bahan termasuk karakteristiknya dan proses manufaktur pembuatan produk berikut komponen-komponennya.

A supporting course for design courses in industrial design, especially from the material aspect, including its characteristics and the manufacturing process for making products and their components.

LO CLO Assessment & Evaluation Plan Lesson Plan

Course Learning Outcomes

Mohon untuk mengecek kurikulum yang lain juga pada pilihan di bawah ini (lalu klik **Tampilkan**). Kemudian mohon pastikan centang CPL telah sesuai dengan yang dibutuhkan oleh CPMK.

Curriculum: Kurikulum 2018 S-1 Desain Produk

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Code	Description of CLO	Mapping of CLO to LO		Weight of CLO
		LO 3	LO 12	
CLO-1	Mahasiswa mampu menjelaskan secara komprehensif spesifikasi teknik produk dan fungsi setiap komponen produk. <i>Students are able to comprehensively explain the product technical specifications and functions of each product component.</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20%
CLO-2	Mahasiswa mampu menjelaskan secara komprehensif bahan dan karakteristik bahan sebuah produk tertentu. <i>Students are able to comprehensively explain the materials and material properties of a particular product.</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	30%
CLO-3	Mahasiswa mampu menjelaskan secara komprehensif proses pembuatan produk secara industri. Memilih dan menjelaskan proses manufaktur yang paling sesuai. <i>Students are able to explain comprehensively the process of making industrial products. Select and describe the most suitable manufacturing process.</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	30%
CLO-4	Mahasiswa mampu menjelaskan bagian-bagian penting dari sebuah produk: sambungan; pegas; poros, pasak dan bearing; ulir pemutar; transmisi mekanik; dan struktur & konstruksi produk. <i>Students are able to explain the important parts of a product: joint/connection; spring; shafts, pins and bearings; turning thread (power screw); mechanical transmission; and product structure & construction.</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20%
Total Weight		50%	50%	100%

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LO CLO Assessment & Evaluation Plan Lesson Plan

Assessment & Evaluation Plan

No.	Evaluation Plan	CLO-1	CLO-2	CLO-3	CLO-4	Total Weight
1	Produk styling, craft, dan apparel. <i>Styling, craft and apparel products.</i> Hasil proyek Team-based Project	4%	6%	6%	4%	20%
2	Produk furniture dan fasilitas publik. <i>Furniture products and public facilities</i> Hasil proyek Team-based Project	4%	6%	6%	4%	20%
3	Produk transportasi dan peralatan. <i>Transportation products and appliances.</i> Hasil proyek Team-based Project	4%	6%	6%	4%	20%
4	Model animasi transmisi mekanik/automata <i>Mech./automata transmission animation.</i> Hasil proyek Team-based Project	4%	6%	6%	4%	20%
5	Pemahaman artikel jurnal desain produk. <i>Understanding of product design journal</i> Kognitif - Quiz Cognitive - Quiz	2%	3%	3%	2%	10%
6	Majalah material dan proses 2021. <i>Material and process magazine 2021.</i> Hasil proyek Team-based Project	2%	3%	3%	2%	10%
TOTAL		20%	30%	30%	20%	100%
Target		20%	30%	30%	20%	100%

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DP164419

Material dan Proses

Material and Process

3 credits

Coordinator: Prof.Dr. Ir. Bambang Iskandriawan, M.Eng.

Course Form

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Course Type

: Tidak Ada

Minimum Passing Grade

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C

Course Description

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LO CLO Assessment & Evaluation Plan Lesson Plan

Lesson Plan

Weeknum	Course Material	Learning Method		
1	Material properties: density, young's modulus, strength dan cost. Material properties: density, young's modulus, strength and cost.	Case method	📄	📄
2	Material properties: elongation, toughness, resistivity, energy content, maximum service temperature dan recycle. Seleksi material untuk desain produk. Material properties: elongation, toughness, resistivity, energy content, maximum service temperature and recycle. Material selection for product design.	Case method	📄	📄
3	Jenis-jenis bahan buatan dan alami. Types of artificial and natural materials.	Case method	📄	📄
4	Proses pembuatan komponen-komponen produk: molding, casting, bulk forming, sheet forming, rapid prototyping, lay-up method dan powder methods. The process of making product components (manufacture process): molding, casting, bulk forming, sheet forming, rapid prototyping, lay-up methods and powder methods.	Case method	📄	📄
5	Presentasi kelas (kelompok) untuk produk-produk styling, craft, dan apparel. Spesifikasi teknik, fungsi setiap komponen/parts, material dan material properties, proses pembuatan komponen produk dan assembly. Class presentation (group) for styling, craft, and apparel products. Technical specifications, function of each component part, material and material properties, manufacturing process of product components and assembly.	Team-based project	📄	📄
6	Presentasi kelas (kelompok) untuk produk-produk styling, craft, dan apparel. Spesifikasi teknik, fungsi setiap komponen/parts, material dan material properties, proses pembuatan komponen produk dan assembly. Class presentation (group) for styling, craft, and apparel products. Technical specifications, function of each component part, material and material properties, manufacturing process of product components and assembly.	Team-based project	📄	📄
7	Penggunaan juga pemilihan sistim sambungan dan pegas pada produk. The using also the selection of the connection /joint system and springs of the product.	Case method	📄	📄
8	Presentasi kelas (kelompok) untuk produk-produk furniture dan fasilitas publik. Spesifikasi teknik, fungsi setiap komponen/parts, material dan material properties, proses pembuatan komponen produk dan assembly. Class presentation (group) for furniture and public facilities products. Technical specifications, function of each component part, material and material properties, manufacturing process of product components and assembly.	Team-based project	📄	📄
9	Presentasi kelas (kelompok) untuk produk-produk furniture dan fasilitas publik. Spesifikasi teknik, fungsi setiap komponen/parts, material dan material properties, proses pembuatan komponen produk dan assembly. Class presentation (group) for furniture and public facilities products. Technical specifications, function of each component part, material and material properties, manufacturing process of product components and assembly.	Team-based project	📄	📄
10	Penggunaan juga pemilihan sistim poros, pasak, dan bearings pada produk. The using also the selection of shafts, pins, and bearings in the product.	Case method	📄	📄
11	Presentasi kelas (kelompok) untuk produk-produk transportasi dan peralatan. Spesifikasi teknik, fungsi setiap komponen/parts, material dan material properties, proses pembuatan komponen produk dan assembly. Class presentation (group) for transportation products and equipment/appliances. Technical specifications, function of each component part, material and material properties, manufacturing process of product components and assembly.	Team-based project	📄	📄
12	Presentasi kelas (kelompok) untuk produk-produk transportasi dan peralatan. Spesifikasi teknik, fungsi setiap komponen/parts, material dan material properties, proses pembuatan komponen produk dan assembly. Class presentation (group) for transportation products and equipment/appliances. Technical specifications, function of each component part, material and material properties, manufacturing process of product components and assembly.	Team-based project	📄	📄
13	Penggunaan juga pemilihan sistim transmisi mekanik, power screw, dan struktur & konstruksi pada produk. The using also the selection of mechanical transmission systems, power screws, and the structure & construction of the product.	Case method	📄	📄
14	Implementasi sistim mekanik gerak dan automata. Implementation of motion mechanics and automata systems.	Case method	📄	📄
15	Presentasi kelas (kelompok) sistim mekanik gerak dan automata. Class presentation (group) of motion mechanics and automata systems.	Team-based project	📄	📄
16	Tugas akhir semester. End of semester assignments.	Team-based project	📄	📄

Bahasa Indonesia

English

Choose method

📄

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