



## SURAT TUGAS

No. 026/LPPM USD/II/2020

Ketua Lembaga Penelitian dan Pengabdian Kepada Masyarakat Universitas Sanata Dharma Yogyakarta dengan ini memberikan tugas kepada:

Nama : Dr. Dewi Setyaningsih, Apt.  
Pekerjaan : Dosen  
NIP/NIDN : P.1717/ 0520017401  
Jabatan Fungsional : Lektor  
Program Studi : Farmasi  
Fakultas : Farmasi

Untuk melaksanakan kegiatan pengabdian kepada masyarakat memberikan kuliah umum "Proses Industri Kimia" di Fakultas Farmasi UNPAR pada:

Hari/Tanggal : Kamis – Jumat, 27 - 28 Februari 2020  
Waktu : 08.00 WIB - Selesai  
Tempat : Ruang 10.122 Gedung 10 UNPAR, Jl. Ciumbuleuit No. 94 Bandung.

Demikian Surat Tugas ini dibuat, agar yang berkepentingan melaksanakannya.

Yogyakarta, 25 Februari 2020  
Lembaga Penelitian dan Pengabdian Kepada Masyarakat USD



Dr. rer. nat. Harry Pribawanto Suryawan  
Ketua

Tiba di .....	Berangkat dari .....
Hari/Tanggal .....	Hari/Tanggal .....
Instansi/Lembaga yang Dituju Penanggungjawab Kegiatan	
( ..... ) Jabatan .....	

**Tembusan:**

1. Wakil Rektor I
2. Dekan
3. Ketua Program Studi
4. Arsip





**UNIVERSITAS SANATA DHARMA**  
LEMBAGA PENELITIAN DAN PENGABDIAN KEPADA MASYARAKAT

## **SERTIFIKAT**

No : 043/ LPPM USD /VII/ 2020

*Lembaga Penelitian dan Pengabdian kepada Masyarakat Universitas Sanata Dharma memberikan penghargaan kepada :*

*Nama : Dr. Dewi Setyaningsih, Apt.  
Jabatan : Dosen  
Unit Organisasi : Universitas Sanata Dharma*

*Atas perannya sebagai Instruktur dalam kegiatan pengabdian kepada masyarakat Narasumber kuliah tamu Industri Farmasi pada tanggal 27 - 28 Februari 2020 di Universitas Katolik Parahiyangan*

*Yogyakarta, 8 Juli 2020*

*Lembaga Penelitian dan Pengabdian Kepada Masyarakat  
Universitas Sanata Dharma*

*Dr. rer. nat. Harry Pribawanto Suryawan*  
*KETUA*





## UNIVERSITAS KATOLIK PARAHYANGAN

Jalan Ciumbuleuit 94 Bandung 40141, telp. : +62.22.2030918-20 ext. 100401, 100422  
fax: (022)203 1110, Telp.(022) 203 2655;(022) 204 2004  
Daftar Hadir Kuliah - Semester Genap - 2019 / 2020

ultas  
a Kuliah  
s  
Hari/Ruang

: Teknologi Industri  
: CHE182204 - 3  
Proses Industri Kimia  
: F

: 08:00 - 11:00/ Kamis/ Ruang Kuliah 10121 Dosen Kelas : Prof. Dr. Ignatius Suharto, Ir.,  
APU.

NPM	Nama Mahasiswa														
6141801002	CINDY VERLIA	✓													
6141801004	MICHAEL PRAJANA	✓													
6141801006	THEODORUS LIMAWAN	✓													
6141801008	AUREY JOSEPHINE WU	✓													
6141801012	MICHAEL JOHNATAN BENNY PUTRA	✓													
6141801018	ALICIA TASYA YENARDI	✓													
6141801022	NICOLE XENIA BARNABAS	✓													
5141801028	NIKITA ANGELINE SURYO	✓													
141801032	JEANET LIMANJAYA	✓													
141801034	KHEMIKO	✓													
141801036	RAISA MAHARANI TANIANDINA	✓													
141801038	CHRIST JOSEPH CARLO WIBOWO APOENX	✓													
41801040	IGNATIUS JEREMY	✓													
41801046	STEPHANIE HANAFI	✓													
11801048	AURELIA KURNIA	✓													
11801050	VANESSA LEVINA														
1801052	TEDDY ANGGALA	✓													
1801054	JULIA PERMATASARI														
1801056	IHSAN FAUZI	✓													
1801060	ZENO FISCHER	✓													
801062	STANLEY KOESWANDI HARLIMAN	✓													
801066	EUGENE MICHELLE VYANDA	✓													
801070	FELICIA	✓													
801076	THEODORUS LEVI MULYAPUTRA														
101078	GREGORIUS BRYAN HANDESEN														
101080	VINCENT JULIUS TANLIANO	✓													
101082	MARGARETHA SUMARGO	✓													
101084	KAREN AMARILLYS	✓													
101086	JEFFIN	✓													
101088	NATANAEL NIGEL	✓													
Dosen / Asisten		✓													

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Daftar Hadir Kuliah - Semester Genap - 2019 / 2020

: Teknologi Industri  
: CHE182204 - 3  
Proses Industri Kimia  
: F

Ruang : 08:00 - 11:00/ Kamis/ Ruang Kuliah 10121 Dosen Kelas

Program Studi : Teknik Kimia  
Dosen Koordinator : Dr. Angela Justina Kumalaputri,

: Prof. Dr. Ignatius Suharto, Ir., APU.

PM	Nama Mahasiswa	23/2										
01090	HAROLD JANNUS SAMUEL SILALAHI	✓										
01092	RYVANDO FREDRICK KHANG	✓										
01094	REHAN GUNAWAN	✓										
01096	ALBERT BERNARD CHRISTIAN											
01098	MAXWELL	✓										
01100	RICO											
01102	MUHAMMAD REIHAN ALDIAN	✓										
01106	SHANNEN GABRIELLE WIJAYA	✓										
01108	LUCAS ADRIEL SETIAWAN	✓										
01112	JOSE THOMAS	✓										
01114	MICHAEL LIMNANTA	✓										
01118	YOHANNA DITA	✓										
01120	CLARA ANINDYA AMARANGGANI	✓										
01124	MARGARETH	✓										
01128	FIA MULYANI	✓										
01130	VALENT PANGRASTIKA	✓										
01134	MICHAEL OSBORN	✓										
Dosen / Asisten		✓										

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**Daftar Hadir Kuliah - Semester Genap - 2019 / 2020**

: Teknologi Industri  
 : CHE182204 - 3  
 Proses Industri Kimia  
 : G

: 15:00 - 18:00/ Kamis/ Ruang Kuliah 10214 Dosen Kelas

Program Studi : Teknik Kimia  
 Dosen Koordinator: Dr. Angela Justina Kumalaputri,  
 : Prof. Dr. Ignatius Suharto, Ir., APU.

	Nama Mahasiswa	13/2	20/2	28/2					
1	HANDAYANI	✓	✓						
3	VISCA SYARIFAH	✓	✓						
5	REYNARDI RISYAD RAYTAMA	✓	✓						
2	TRISTAN KRISHNA SOEDJATMIKO	✓	✓						
5	CYNTHIA HARRIS			✓					
8	SEN KIERI								
9	IVANKA MIKOLA JUNAEDI								
1	KARSTEN ABDEL NATHANAEL JOSEPHUS	✓	✓	✓					
5	NATHANAEL EVAN PRASETYA	✓	✓	✓					
6	WILLY CHANDRA	✓	✓	✓					
25	MICHELLE TAMARA THAMRIN	✓	✓						
18	GIOVANI ANGGASTA	✓	✓						
19	FERRY ANTONIUS	✓	✓						
20	STEVANO AGUSTO	✓	✓						
21	FAUZAN RAMADHAN	✓	✓						
22	ANASTASIA	✓	✓						
23	JUVENTIA	✓	✓						
25	MARIA OKTAVIANI SOLOT PAYON	✓	✓	✓					
26	MICHAEL KRISNANTO SENJAYA	✓	✓						
27	EVELYNNE	✓	✓						
28	RYAN HARTONO	✓	✓	✓					
29	THEODORA IRISH CAHYADI	✓	✓						
30	RONAN WILSON	✓	✓						
31	LUCKY YUDHIANTO EKA RAHMAT	✓	✓						
	Dosen / Asisten								

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Jalan Ciumbuleuit 94 Bandung 40141. telp. : +62.22.2030918-29 ext. 109401, 109422  
 fax: (022)203 1110, Telp.(022) 203 2655;(022) 204 2004  
**Daftar Hadir Kuliah - Semester Genap - 2019 / 2020**

: Teknologi Industri  
 : CHE182204 - 3  
 Proses Industri Kimia  
 : E  
 : 08:00 - 11:00/ Senin/ Ruang Kuliah 10120 Dosen Kelas

Program Studi : Teknik Kimia  
 Dosen Koordinator: Dr. Angela Justina Kumalaputri,

: Prof. Dr. Ignatius Suharto, Ir.,  
 APU.

NPM	Nama Mahasiswa	20/01	27/01	4/2	13/2	28/2	
201620095	ALEXANDRA ENDMAR HUKA						
201620105	REYNARDI RISYAD RAYTAMA						
201620015	CYNTHIA HARRIS						
201620021	KARSTEN ABDIEL NATHANAEL JOSEPHUS	✓	✓	✓			
201620025	NATHANAEL EVAN PRASETYA	✓	✓	✓			
201620043	IRENE KUSUMA WARDHANI						
201620055	MICHELLE TAMARA THAMRIN	✓	✓	✓			
201620059	FERRY ANTONIUS	✓	✓	✓			
201620061	FAUZAN RAMADHAN						
201620071	JUVENTIA	✓	✓	✓			
201620073	JOSHUA						
201620079	MARIA OKTAVIANI SOLOT PAYON	✓	✓	✓			
201620087	EVELYNE	✓	✓	✓			
201620109	THEODORA IRISH CAHYADI						
201620121	LUCKY YUDHIANTO EKA RAHMAT	✓	✓	✓			
201620101	CHRISTOFER ALEXANDER	✓	✓	✓			
201620103	JESSEN NATHANAEL	✓	✓	✓			
201620105	FEBBY KURNIAWAN	✓	✓	✓			
201620109	TJIOE GERRY SEBASTIAN WIBOWO	✓	✓	✓			
201620111	ERIC HERMAWAN	✓	✓	✓			
201620113	JENNIFER SUGIANTO	✓	✓	✓			
201620115	FELICIA MIRANDA KUSUMAWARDHANY HARYANTO	✓	✓	✓			
201620117	GIOVANNO MACARIO PURNOMO	✓	✓	✓			
201620119	BAYU KRUSNA HARTONO	✓	✓	✓			
201620221	YENICCA AMELLY	✓	✓	✓			
	Dosen / Asisten	✓	✓	✓			

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fax: (022)203 1110, Telp.(022) 203 2655;(022) 204 2004

**Daftar Hadir Kuliah - Semester Genap - 2019 / 2020**



as : Teknologi Industri  
 Kuliah : CHE182204 - 3  
 Proses Industri Kimia  
 : E  
 ari/Ruang : 08:00 - 11:00/ Senin/ Ruang Kuliah 10120 Dosen Kelas : Prof. Dr. Ignatius Suharto, Ir.,  
 APU.

NPM	Nama Mahasiswa	20/01	27/01	6/2	13/2	20/2	
6141801027	LOURDES URSELA CARMEN	1*	1*	1*	1*	1*	
6141801031	GABRIELA SHANE HADI PRANOTO	1*	1*	1*	1*	1*	
6141801033	JENNIFER VANIA	1*	1*	1*	1*	1*	
6141801039	ANGELA DEFFIANE	1*	1*	1*	1*	1*	
6141801041	MARIA CLARISSA GAVRILA	1*	1*	1*	1*	1*	
6141801045	MELIANI TASLIM	1*	1*	1*	1*	1*	
6141801047	ALVIN DARMAWAN SETYADI	1*	1*	1*	1*	1*	
6141801049	GERALDO PRAJNA	1*	1*	1*	1*	1*	
6141801051	DICKY RENALDY	1*	1*	1*	1*	1*	
6141801055	CHRISTIAN	1*	1*	1*	1*	1*	
6141801057	ALBERT HALIM JAYA	1*	1*	1*	1*	1*	
6141801065	SAMUEL BILLY BUDYANTO	1*	1*	1*	1*	1*	
6141801067	VANESSA AUDREYLIA	1*	1*	1*	1*	1*	
6141801071	SYLVIA CHANDRA	1*	1*	1*	1*	1*	
6141801073	RADHESA KILAT BUWANA	1*	1*	1*	1*	1*	
6141801075	THEODORE SEBASTIAN BRATASENA	1*	1*	1*	1*	1*	
6141801077	HOSEA STEVEN MARYANTO	1*	1*	1*	1*	1*	
6141801079	AXEL NATHANAEL RIANTO	1*	1*	1*	1*	1*	
6141801081	BONIFASIUS MATTHEW	1*					
6141801083	AMADEUS VINCENT WIDJAJA	1*					
6141801091	KLARA NATHANIA SEKARNINGRUM SETYANTI	1*	1*	1*	1*	1*	
6141801093	JONATHAN WIDJAJA	1*	1*	1*	1*	1*	
6141801095	ELISABETH PRISCILLA AYUNINGTYAS INDRAJANU	1*	1*	1*	1*	1*	
6141801097	DEA NETTA PRISCILIA CHAN	1*	1*	1*	1*	1*	
6141801099	VIERI CHRISTIAN	1*	1*	1*	1*	1*	
Dosen / Asisten		1*	1*	1*	1*		

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fax: (022)203 1110, Telp.(022) 203 2655;(022) 204 2004

Daftar Hadir Kuliah - Semester Genap - 2019 / 2020



**S** : Teknologi Industri  
**uliah** : CHE182204 - 3  
 Proses Industri Kimia  
**E** :

T/Ruang : 08:00 - 11:00/ Senin/ Ruang Kuliah 10120 Dosen Kelas : Prof. Dr. Ignatius Suharto, Ir.,  
 APU.

NPM	Nama Mahasiswa	2/0/1	2/7/0/1	6/2	13/1	23/2	
141801101	WILLIAM ANTHONY MARKUS	✓	✓	✓	✓	✓	
141801103	GRACIELLA LORENZ SUSANTO	✓	✓	✓	✓	✓	
141801105	ABRAHAM ZEFANYA	✓	✓	✓	✓	✓	
141801107	WIDA SLOVENIA JODY	✓	✓	✓	✓	✓	
141801109	RAYHAN FAISAL SIREGAR	✓	✓	✓	✓	✓	
141801111	MICHELLE	✓	✓	✓	✓	✓	
141801113	ANNASTHASYA MILLENI ANGELINA	✓	✓	✓	✓	✓	
141801115	DENNIS MEIDANE	✓	✓	✓	✓	✓	
141801117	YESICA CHINDRA	✓	✓	✓	✓	✓	
141801119	NICO NATHANIEL	✓	✓	✓	✓	✓	
141801123	ARIQ ARDHITO PUTRA	✓	✓	✓	✓	✓	
141801125	DAUD VIDI	✓	✓	✓	✓	✓	
141801127	ANDRANYSSA VIMORES MARIA RUMONDOR	✓	✓	✓	✓	✓	
14180131	DAVE	✓	✓	✓	✓	✓	
14180133	SABELLE SERENA	✓	✓	✓	✓	✓	
	Dosen / Asisten	✓	✓	✓	✓	✓	

14180168 Margaretha Regna Y.

C.

**FARMASI INDUSTRI**  
**FAKULTAS TEKNOLOGI INDUSTRI JURUSAN TEKNIK KIMIA**  
**UNIVERSITAS KATOLIK PARAHYANGAN**

Dr. Dewi Setyaningsih, M.Sc., Apt  
Fakultas Farmasi Universitas Sanata Dharma  
dewi@usd.ac.id

Universitas Sanata Dharma

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## Content

- Faculty of Pharmacy SD
- Pharmacist-Pharmacy
- History: thalidomide, contaminant in vaccines
- Processes Flow Diagram:
  - Manufacturing (tablet, semi liquid, liquid)
  - Water purification
- Regulation



Integrating academic excellence and humanistic values

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..\Video\Universitas Sanata Dharma Yogyakarta\_(1).mp4

Seminar, 18-19 Juni 2020

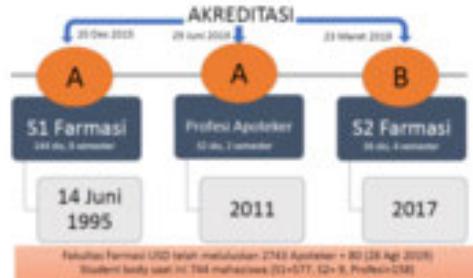
Sinta 2 Jurnal

<https://www.usd.ac.id/seminar/icpharm/>

<https://e-journal.usd.ac.id/index.php/JFSK>

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## Fakultas Farmasi



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Research line

Social and Behavioral Pharmacy: Asthma, Pharmacy education

Biology Pharmacy: Antibacterial agent, Immunomodulator, Ethnomedicine

Drug discovery: computational chemistry, optimization of an analytical method

Pharmaceutical Technology: bioavailability enhancement of lipophilic drugs, wound healing

Pharmacology and Toxicology: smoking cessation, diabetic

Indonesian Natural Product for Degenerative Diseases (Antioxidant and Diabetic as the Main Theme)

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Pharmacist

Chemical science

Health science

Chemical

Safe, effective, and affordable use of drug

Chemical and human body

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**Practices**

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Community/patient care      Hospital      Drug store  
pharma      academia/researcher      regulator

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	GENERIC	BRAND-NAME
Safe	✓ Safe	✓ Safe
Effective	✓ Effective	✓ Effective
High-Quality	✓ High-Quality	✓ High-Quality

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**Pharmaceutical Industry area**

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discovers, develops, produces, and markets drugs  
Pharma company  
to cure them, vaccinate them, or alleviate the symptom  
subject to a variety of laws and regulations that govern the patenting, testing, safety, efficacy and marketing of drugs

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**Pharmaceutical industry**

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Drug production is a specialized area. Drugs are chemical based and chemicals too are sensitive to changes in weather conditions and radiation. Therefore drugs can kill very fast. Pharmaceutical industry design therefore demands specialized knowledge, for the consumer. Again the regulatory requirements for production a good understanding of how the industry is run and how best to ensure the production of efficacious and quality products facilities within the pharmaceutical industry are being continually and incessantly tightened.

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**CONCEPT**

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- ✓ Pembuktian melalui data komprehensif
- ✓ Regulasi yang ketat
- ✓ Pemenuhan etika pada pengujian

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**Pharmaceutical Industry**

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The **pharmaceutical industry** discovers, develops, produces, and markets **drugs or pharmaceutical drugs** for use as **medications** to be administered (or self-administered) to patients, with the aim to **cure** them, **vaccinate** them, or **alleviate the symptoms**. Pharmaceutical companies may deal in **generic or brand medications** and **medical devices**. They are subject to a **variety of laws and regulations** that govern the **patenting, testing, safety, efficacy and marketing of drugs**

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**Teknik Industri dan Farmasi**

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The diagram consists of two overlapping circles. The left circle is labeled 'Teknik Industri' and the right circle is labeled 'Farmasi'. Their intersection contains the following text:

- Perencanaan lokasi dan perancangan (tata letak) pabrik
- Pengendalian mutu
- Logistik (penanganan material dan distribusi)
- Perancangan produk dan jasa

Below the circles, a horizontal line spans the width of the diagram with the text "Integrating academic excellence and humanistic values".

**History of pharmaceutical industry**

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A painting of a woman holding a child, with a sign above them that reads "COCAINE TOOTHACHE DROPS". Below the painting is the text "Integrating academic excellence and humanistic values".

**History of pharmaceutical industry**

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The collage includes several images: a terracotta tablet, a cityscape, a person working at a desk, a portrait of Heinrich Emanuel Merck, and a prescription book. Below the collage is the text "Integrating academic excellence and humanistic values".

**Tragedi di dunia farmasi**

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The collage includes a woman in a lab coat, a poster for "THALIDOMIDE", a baby, and a chemical structure of diethylene glycol. Below the collage is the text "Integrating academic excellence and humanistic values".

1901 : Tragedi vaksin diphtheria terkontaminasi bakteri tetanus → kematian 14 anak usai vaksinasi  
 1938: Sulfanamid eliksir, kematian 100 orang karena penggunaan diethylene glycol (highly toxic solvent) sebagai co-solvent Sulfanamide dalam formulasi.  
 1962 an : tragedi (10.000 birth defects)dari obat baru Thalidomide → morning sickness  
[\Video\Thalidomide- A Generational Tragedy and a Triumph for Safety Regulations in History.mp4](#)  
[\Video\Children of Thalidomide.mp4](#)

**Pharmaceutical Industries in the past and now**

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The diagram shows a transition from "Product oriented" (a person in a lab coat) to "Patient safety and care" (a doctor interacting with a patient). A blue arrow points from left to right. To the right of the arrow is the text "Perubahan besar regulasi dan industri farmasi". Below the diagram is the text "Integrating academic excellence and humanistic values".

**Pharmaceutical Industry area**

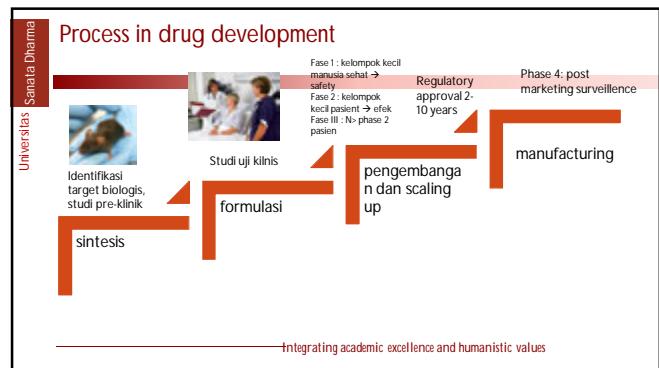
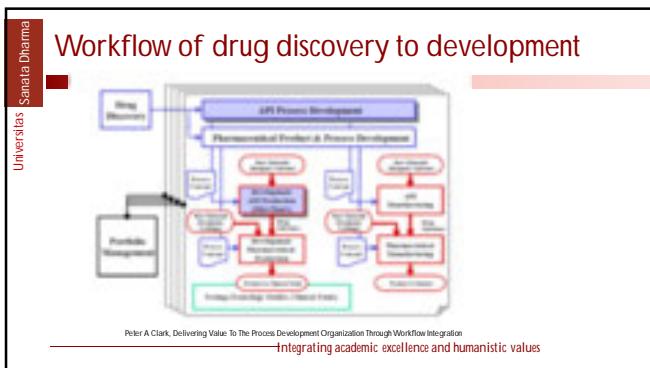
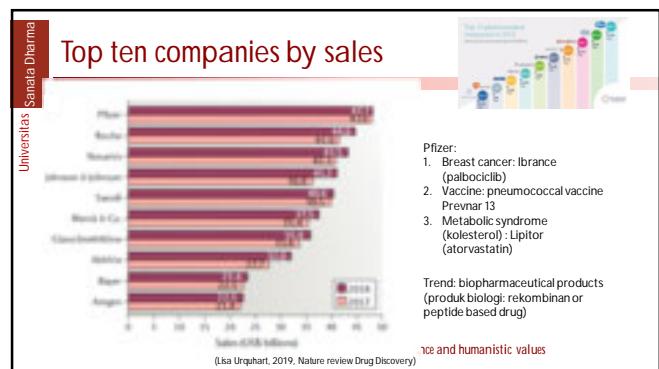
Universitas Sanata Dharma

The diagram shows a circular flow: "discovers, develops, produces, and markets drugs" leading to "Pharma company" which "to cure them, vaccinate them, or alleviate the symptom". To the right is a comparison chart between "GENERIC" and "BRAND-NAME" drugs. Below the diagram is the text "subject to a variety of laws and regulations that govern the patenting, testing, safety, efficacy and marketing of drugs".

**The players in Pharmaceutical Industries**

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**Designing pharmaceutical industries**

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- Regulation:
  - World Health Organisation (WHO) specifications, standards and requirements.
  - GMP (Good Manufacturing Practise)
  - CPOB (Cara Pembuatan Obat yang Baik)
  - ISO
  - Marketing / drug information
  - Environmental regulation
- Knowledge of modern trends in technologies
- Health and ethical issues

Worldwide regulatory network

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**Industri Farmasi**

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- ....\Video\Unpar\Pharmaceutical production site of Glen.mp4
- ....\Video\Unpar\Plant for the production of solid dosage forms Notol 2.mp4

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**GMP (Good Manufacturing Practise)**

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system for ensuring and controlling  
quality standar of pharmaceutical products  
minimize risks that cannot be eliminated at the final product

Cara Pembuatan Obat yang Baik (CPOB) = Indonesia GMP

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**CPOB**

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Referensi Industri Farmasi Indonesia

1. Sistem Mutu Industri Farmasi
2. Personalia
3. Bangunan – Fasilitas
4. Peralatan
5. Produksi
6. Cara Penyimpanan dan Pengiriman Obat yang Baik
7. Pengawasan Mutu
8. Inspeksi Diri, Audit Mutu dan Audit dan Persetujuan Pemasok
9. Keluhan dan Penarikan Produk
10. Dokumentasi
11. Kegiatan Alih Daya
12. Kualifikasi dan Validasi

**BADAN POM CPOB**

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**Personalia dan organisasi**

Universitas Sanata Dharma

Engineer di Perusahaan Farmasi

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**Tanggung jawab**

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- Menyusun dan mengembangkan sistem dalam departemen yaitu menyusun dan mengembangkan perencanaan, pengorganisasian, penugasan, pengawasan dan dokumentasi pekerjaan.
- Menyusun dan mengembangkan sistem pemeliharaan pabrik (HVAC, Ducting)
- Bertanggung jawab terhadap ketersediaan energi, air dan pengolahan limbah pabrik, pemeliharaan peralatan
- Koordinasi dan pengawasan terhadap proyek

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**Bangunan**

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Tata letak dan desain ruangan harus dibuat sedemikian rupa untuk memperkecil risiko terjadi ketidakjelasan, kontaminasi silang dan kesalahan lain, serta memudahkan pembersihan, sanitasi dan perawatan yang efektif untuk menghindarkan kontaminasi silang, penumpukan debu atau kotoran, dan dampak lain yang dapat menurunkan mutu obat

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**Klasifikasi ruang produksi steril**

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Klasifikasi	Nonoperasional		Operasional	
	Ruang produksi steril tidak langsung berhubungan dengan operasi produksi		Ruang produksi steril langsung berhubungan dengan operasi produksi	
Ia	≤ 100.000	≥ 100.000	≤ 10.000	≥ 10.000
IIa	≤ 10.000	≥ 10.000	≤ 1.000	≥ 1.000
IIb	≤ 100.000	≥ 100.000	≤ 10.000	≥ 10.000
III	≤ 100.000	≥ 100.000	≤ 10.000	≥ 10.000

Operasional = kegiatan produksi berlangsung

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**Jumlah rata-rata mikroba sesuai kelas**

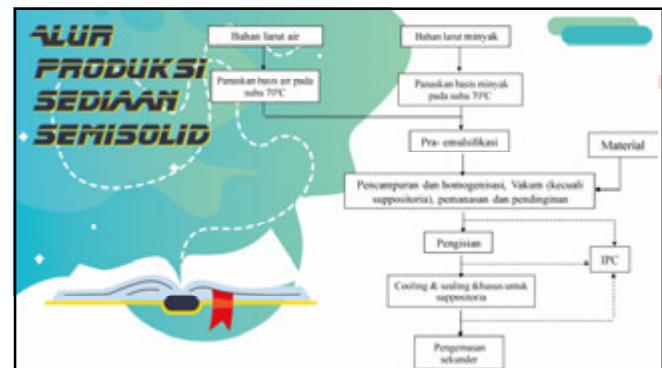
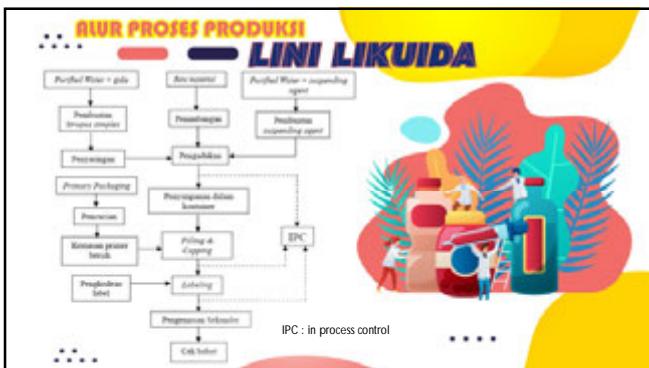
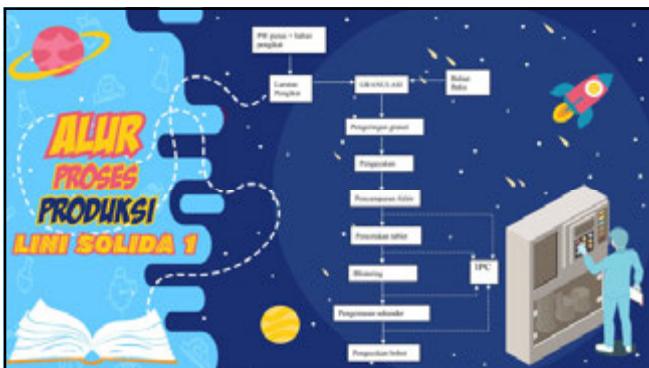
Kelas	Banyak kulit individu ( $\text{cfu}/\text{cm}^2$ )	Rasio yang diperlukan untuk resorpsi mikroba (%)	
		Cetakan papir diketahui 30 menit $\text{cfu}/4 \text{ jam}$ **	Cetakan konsentrasi diketahui 25 menit $\text{cfu}/\text{pilote}$
A	<1	<1	<1
B	10	2	0
C	100	20	25
D	200	100	50

\*\* Waktu yang dibutuhkan untuk resorpsi mikroba (%)

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**Produksi – contoh produk**

 kapsul	 soft capsule	 tablet
 cream	 injeksi	 sirup



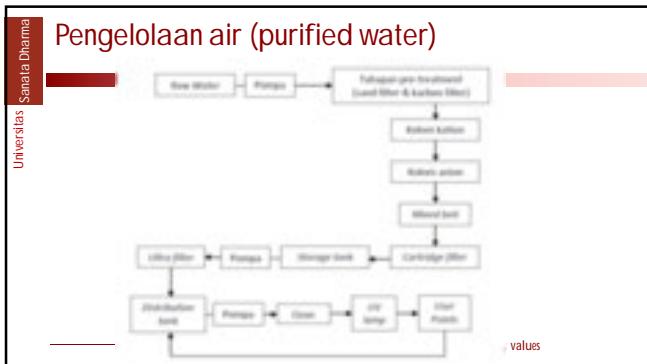


## Contoh proses produksi sediaan farmasi

[□ ...\\Video\\How medicines are made.mp4](#)

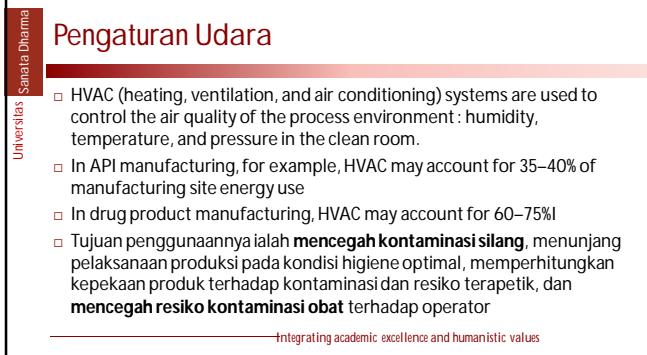
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## Parameter kualitas air

No.	Parameter	Pemeriksaan Fisik	Spesifikasi
1.	Warna	Tidak berwarna	
	Bau	Tidak berbau	
	Rasa	Tidak berasa	
2.	pH	5 - 7	5.8 - 6.3
	Normal limit	5.5 - 7.0	< 6.3 - 6.5
	Alert limit	< 5.5 atau > 6.5	
	Action limit	< 5.1 $\mu\text{s}/\text{cm}$	
3.	Konduktivitas pada 25 °C	< 2 $\mu\text{s}/\text{cm}$	3 - 4.7 $\mu\text{s}/\text{cm}$
4.	TOC	< 0.5 mg/L	Larut berwarna merah muda
5.	Oxidizable substances (KMnO <sub>4</sub> )		
6.	Nitrat	$\leq 0.2 \text{ ppm}$	$\leq 0.2 \text{ ppm}$
7.	Logam berat (Pb)	$\leq 0.1 \text{ ppm}$	$\leq 0.1 \text{ ppm}$
8.	Total hardness (CaCO <sub>3</sub> )	NA	
9.	E.coli		
	Total Plate Count	$< 100 \text{ cfu/ml}$	
	Normal limit	$< 60 \text{ cfu/ml}$	
	Alert limit	$60 - 80 \text{ cfu/ml}$	
	Action limit	$> 80 \text{ cfu/ml}$	
		0 per 100 ml	0 per 100 ml
	Salmonella sp.		
			Pemeriksaan Mikrobiologi



## Air compressor unit

Untuk menyediakan udara sesuai dengan spesifikasi sehingga menjamin tidak terjadinya kontaminasi

Oil free compressed air



Untuk membersihkan/menyuplai udara yang bersentuhan dengan produk

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Non Oil free compressed air

```

graph LR
    A[Pre-filter] --> B[Compressed air]
    B --> C[Air dryer]
    C --> D[Filter]
    D --> E[Buffer]
  
```

Untuk membersihkan alat-alat yang tidak bersentuhan dengan produk

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Terimakasih

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