STUDYINBALI

COURSE PROGRAM
SOUTHEAST ASIAN ENGINEERING

UNIVERSITAS UDAYANA

SOUTHEAST ASIAN ENGINEERING

The Southeast Asian Engineering Program is an intensive 15-week course hosted by Universitas Udayana in Bali, designed to prepare participants for the unique engineering challenges of tropical Southeast Asia. Blending core subjects in civil, mechanical, and electrical engineering, the program focuses on critical issues such as earthquake-resistant construction, renewable energy, and sustainable urban transportation tailored to the region's demands. Throughout the program, students dive into modules like SEA Renewable Energy & Sustainability, Material Science for Tropical Environments, and Earthquake Science, each offering a practical perspective on engineering in Southeast Asia. Weekly excursions to significant engineering sites around Bali provide hands-on exposure, connecting theoretical knowledge to real-world applications. By the program's conclusion, participants will have developed skills and insights needed to design sustainable, resilient solutions for Southeast Asia's dynamic environment, making this program ideal for those seeking a globally relevant and impactful engineering experience.

IMPORTANT ISSUES

Class Schedules:
- Summer Class: April-July
- Winter Class: September-December

Duration: 15 weeks/1 semester

Study Fees:
- € 1850

Credit Points:
- max. 30 ECTS

University: Universitas Udayana

STUDY DESTINATION: BALI, INDONESIA

Bali is a remarkable destination for academic exploration, offering a vibrant learning environment enriched by its unique cultural heritage and natural diversity. Known for its stunning landscapes—from tropical rainforests and rice terraces to volcanic mountains—Bali also serves as an invaluable setting to study sustainable engineering practices in real-world contexts. The island's distinct challenges, like its location within the "Pacific Ring of Fire" and rapid urbanization, make it an ideal place to explore topics such as earthquake-resistant design, renewable energy applications, and sustainable development.

Beyond the classroom, Bali provides an immersive cultural experience that broadens students' perspectives, with opportunities to engage with local communities, learn from traditional Balinese practices, and witness firsthand how engineering principles are applied within Southeast Asian contexts. Studying in Bali combines rigorous academics with a rich cultural setting, inspiring students to approach their field from a global, environmentally-conscious viewpoint.

HOST INSTITUTION: UNIVERSITAS UDAYANA

As Bali's oldest and most respected university, Universitas Udayana (Unud) is the perfect host for the Southeast Asian Engineering Program. For over a decade, the university's Faculty of Engineering has offered this specialized international program in partnership with StudyInBali, attracting students from around the world who are eager to address the engineering challenges unique to Southeast Asia. This collaboration combines Unud's academic expertise with StudyInBali's experience in immersive, cross-cultural education.

The Faculty of Engineering at Universitas Udayana stands out for its commitment to sustainability and innovation in tropical engineering. Offering courses across civil, mechanical, and electrical engineering, as well as architecture, the faculty equips students with both theoretical foundations and practical skills. Students benefit from access to specialized labs, expert faculty, and a curriculum that emphasizes hands-on projects and fieldwork across Bali. This approach makes the faculty especially suited for the Southeast Asian Engineering Program, which requires understanding regional construction methods, renewable energy, and resilience in infrastructure.

With Bali as a living laboratory, Unud provides the academic resources and real-world insights necessary for a transformative educational experience, making it an exceptional host for students eager to learn and apply engineering skills in a tropical environment.

IMPORTANT ISSUES

Application Deadlines:

- Application deadline: 31 December (Summer Class); 15 June (Winter Class)

Class Schedules:

- Summer Class: April – July; Winter Class: September – December

Study Fees:

- Study Fees: € 1850
- The study fees include lectures, workshops, welcoming event, academic excursions & workshops, airport pickup and other student services.
- The study fees EXCLUDE living costs, visa costs, accommodations, travel costs, and transportation

MODULES

1. SEA Renewable Energy & Sustainability – 5 CP
2. Material Science: Natural Materials & Materials of the Tropics – 5 CP
3. Student Project – 5 CP
4. Indonesian Language, History & Culture – 5 CP

Civil Engineering Modules:

5. Earthquake Science – 5 CP
6. Urban Transportation – 5 CP

Mechanical & Electrical Engineering Modules:

7. Manufacturing Process – 5 CP
8. Industrial Technology – 5 CP

🔗 International Credit Transfer Table

WORKLOAD

CODE	MODULE	CLASS		GUEST LECTURE	EXCURSION	WORKSHOP	SELF-STUDY	PAPERS & EXAMINATION	TOTAL WORKLOAD	**CREDITS**
		weekly	total	total	total	total	total	total		
E.01	**SEA Renewable Energy & Sustainability**	2	24	2	14	5	75	30	150	**5**
E.02	**Material Science: Natural Materials & Materials of the Tropics**	2	24	1	20		75	30	150	**5**
E.03	**Student Project**	2	24	1	20		75	30	150	**5**
BI.01	**Indonesian Language, History & Culture**	2	24		20		75	30	149	**5**
CE.01	**Earthquake Science**	2	24		12	6	75	30	147	**5**
CE02	**Urban Transportation**	2	24	2	15	4	75	30	150	**5**
ME.01	**Industrial Technology**	2	24		20		75	30	149	**5**
ME.02	**Manufacturing Process**	2	24		20		75	30	149	**5**

MODULE SELECTION

The Southeast Asian Engineering Program provides students with a comprehensive curriculum, allowing them to focus on either Civil Engineering or Mechanical and Electrical Engineering. Four core modules—SEA Renewable Energy & Sustainability, Material Science, Student Project, and Indonesian Language and History—are designed to provide foundational knowledge for all participants.

In addition to these core modules, students select two further modules based on their chosen specialization:

- Civil Engineering Track: Earthquake Science and Urban Transportation
- Mechanical and Electrical Engineering Track: Manufacturing Process and Industrial Technology

While it is highly recommended that students complete all six modules for a total of 30 ECTS credits, a minimum of 20 ECTS credits is required to receive a certificate. Completing the full program offers a more in-depth educational experience and is strongly encouraged.

EXCURSIONs & WORKSHOPS

Excursions and workshops are an integral part of the Southeast Asian Engineering Program, providing hands-on experience and practical insights that enhance classroom learning. These activities connect students with real-world engineering practices, covering topics like earthquake-resistant structures, renewable energy installations, and sustainable urban infrastructure. Excursions are scheduled regularly and may include visits to local engineering sites, sustainable energy facilities, and urban development projects. Participation in these excursions and workshops is mandatory, contributing to the 75% attendance requirement and deepening students' understanding of engineering within Southeast Asia's unique environmental context.

ASSESSMENT & MARKING

Students must meet all assessment criteria to be eligible for final markings. The criteria include:

- Minimum of 75% attendance in classes, workshops, and excursions. (Students must sign the attendance list each time they participate in class or excursions.)
- Submission of all required assignments.
- Attendance at both the mid-term and final exams.
- Active participation and demonstration of soft skills throughout the program.

These criteria ensure that students are fully engaged in both the academic and practical aspects of the program and that they meet the necessary standards for successful completion.

GRADING AND CURRICULUM

Academic systems vary across different countries. In Indonesia, tertiary education is administered by the Ministry of Higher Education and Research. The Southeast Asian Engineering study abroad program does not grant a degree but provides students with a maximum of 30 ECTS credit points, transferable to home universities. To achieve the full 30 credits, students must actively participate in classes, case studies, guest lectures, academic excursions, site visits, and student projects.

Attendance of at least 75% is required to be eligible for exams. An absence of more than three weeks will result in deregistration from the program. Attendance is compulsory starting from the first day of orientation week.

CERTIFICATES

Students will receive their official certificates from Universitas Udayana at graduation event. Upon successfully completing all course requirements, students will be awarded certificates as follows:

- A certificate confirming that the student has completed the full 15-week course.
- An academic transcript outlining the student's performance throughout the program. The grades listed on the transcript will reflect the final marks.
- A certificate verifying the student's participation in workshops and, upon request, certain academic excursions.

ELIGIBILITY

The Southeast Asian Engineering Program at Universitas Udayana is specifically designed for students with a background in engineering and related technical fields. It is open to individuals from universities and institutions offering studies at the bachelor's, master's, or diploma level. This program is ideal for students and early-career professionals who wish to engage in tropical engineering practices and address the unique environmental and infrastructural challenges of Southeast Asia.

Applicants should have completed at least one year (or two semesters) of study in engineering or a related field to ensure they possess the foundational knowledge required for this intensive program. Relevant fields of study include, but are not limited to:

- Civil Engineering
- Mechanical Engineering
- Electrical Engineering
- Environmental Engineering
- Renewable Energies
- Mechatronics
- Urban Studies

The program welcomes students from these fields and similar disciplines who are eager to apply their knowledge in a Southeast Asian context.

1. SEA RENEWABLE ENERGY & SUSTAINABILITY (5 ECTS)

Lecturing Team	Prof. I Nyoman Suprapta Winaya (Coordinator), Dr. Eng Made Sucipta, I Nyoman Satya Kumara, Ph.D
Time	weekly
Duration	150 hours in total
Credit Points	5 ECTS
Department	Faculty of Engineering, Universitas Udayana
Location	Sudirman Campus, Bali

COURSE DESCRIPTION

This module focuses on the diverse landscape of renewable energy in Southeast Asia, examining sustainable energy sources such as bio-energy, solar power, and wind energy, with a special emphasis on the tropical context. Students will engage with the technical, environmental, and economic aspects of renewable energy, learning to assess and implement energy solutions tailored to Southeast Asia's unique climate and resources.

LEARNING OBJECTIVES

By the end of this module, students will be able to:

1. Identify and explain the primary renewable energy sources applicable in Southeast Asia.
2. Assess the feasibility and environmental impact of implementing various renewable energy solutions in a tropical setting.
3. Analyze case studies and propose sustainable energy projects suited to local conditions.
4. Develop a critical understanding of the socio-economic factors influencing renewable energy adoption in Southeast Asia.

COURSE CONTENT

1. **Renewable energy – an introduction:** Overview of energy consumption and renewable energy in general, addressing why renewables are important, methods of analysis for renewable energy (RE) technologies, costs and performance metrics, and energy policy considerations.
2. **RE from Biomass I:** An introduction to RE systems for energy derived from biomass with a focus on non-thermal technology conversion.
3. **RE from Biomass II:** Focus on biomass thermal technology conversion, including pyrolysis, gasification, and combustion; discussion on environmental issues and relevant policy.
4. **RE from Tidal and Wave Power: Design efficiency considerations, system elements, and socioeconomic and policy factors.**
5. **RE from Collector Solar Energy:** Solar thermal plant design, including collector and plant types, efficiency, socioeconomic factors, and environmental impacts.
6. **RE from PV Solar Energy:** Design of photovoltaic systems, grid-tied versus off-grid systems, efficiency, and the associated socioeconomic and environmental factors.
7. **RE from Hydro:** Hydro turbine design, efficiency, system elements, and the mathematics of hydropower, along with socioeconomic considerations.

1. SEA RENEWABLE ENERGY & SUSTAINABILITY (5 ECTS)

8**. RE from Wind:** Wind turbine design, efficiency, power control, and wind farm applications with a focus on socioeconomic factors.
9. **RE from Geothermal Resources:** Geothermal power design, efficiency, and environmental and policy factors.
10. **RE from Fuel Cell:** Fuel characteristics, design efficiency, system elements, and fuel-cell power considerations in terms of socioeconomic and environmental policy factors.
11. **Fieldwork:** Visits to renewable energy plants to observe practical implementations of various RE technologies
12. **Class Seminar and Case Studies (1):** Student presentations on RE project work, followed by discussions. Presentations include local students, lecturers, and tutors.
13. **Class Seminar and Case Studies (2):** Continuation of presentations and in-depth case studies analysis.

ASSESSMENT

Indoor and outdoor lectures or tutorials, guest lectures, group discussions, site visits, case studies and small projects.

1. Active participation (no less than 75% attendance)
2. 30% from short assignments (individual)
3. 35% from Student Project presentation (group)
4. 35% from final examination or Student Project presentation (individual)

2. NATURAL MATERIALS & MATERIALS OF THE TROPICS (5 CP)

Lecturing Team	D.M Priyantha Wedagama, ST., MT., MSc., Ph.D, Dr. Ari Subagja Ir. I Gusti Putu Suparsa, MT
Time	weekly
Duration	150 hours in total
Credit Points	5 ECTS
Department	Faculty of Engineering, Universitas Udayana
Location	Sudirman Campus, Bali

COURSE DESCRIPTION

This module introduces students to the natural materials commonly found and utilized in tropical countries such as Indonesia. It covers the properties of these materials, including their mechanical, electrical, and structural characteristics. The course places a strong emphasis on green and sustainable concepts, encouraging students to actively engage in discussions on the innovative applications of these materials within engineering and industrial contexts.

LEARNING OBJECTIVES

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

- Understand the fundamental concepts, philosophy, and challenges of using natural materials in tropical regions.
- Design or propose innovative uses for natural materials in engineering or industrial applications.

COURSE CONTENT

1. **Natural Materials in Indonesia and Southeast Asia:** History and overview of materials used in building, interior, infrastructure, and industrial applications in Indonesia and neighboring countries.
2. **Geographical and Socio-cultural Factors:** How geography, culture, and technology influence the use of natural materials in the tropics.
3. **Green and Sustainable Development:** Analyzing the benefits, challenges, and practices associated with green material concepts in Indonesia, including political, technological, and cultural factors.
4. **Conservation and Traditional Technology:** Different approaches to raw material processing for construction and industry in developing countries.
5. **Forestry Materials:** Characteristics, classification, usage, and environmental challenges of materials like wood and bamboo in construction.
6. **Recycling and Reuse:** Trends, technologies, and potential applications for recycled materials.
7. **Ground Materials:** Exploration of stones, minerals, and metals, including their classification, traditional usage, and construction methods.
8. **Innovative Materials for Engineering:** Examination of bio-materials like seashells, coconut wood, and water hyacinth for potential industrial applications.
9. **Student Assignment:** Group research and project development on an innovative material concept for use in engineering or industry.
10. **Ecology and Environmental Issues:** Presentation and group discussion of student assignments in a seminar format.

2. NATURAL MATERIALS & MATERIALS OF THE TROPICS (5 CP)

ASSESSMENT

Indoor and outdoor lectures or tutorials, guest lectures, group discussions, site visits, case studies and small projects.

1. Active participation (no less than 75% attendance)
2. 30% from short assignments (individual)
3. 35% from Student Project presentation (group)
4. 35% from final examination or Student Project presentation (individual)

3. STUDENT PROJECT (5 CP)

Lecturing Team	Prof. Winaya Suprapta, Prof. Ngakan Suardana, Prof. Arya Tenaya
Duration	150 hours in total
Credit Points	5 ECTS
Department	Faculty of Engineering, Universitas Udayana
Location	Sudirman Campus, Bali

COURSE DESCRIPTION

In this module, students engage in a tailored project or research task that aligns with their field of study—whether in Civil, Electrical, or Mechanical Engineering. Each student selects a project or research topic in consultation with a professor, aiming to apply engineering principles to practical issues. The project ideally focuses on Bali's unique challenges, drawing comparisons with engineering practices in the student's home country. Weekly meetings with professors guide students through progress milestones, fostering continuous improvement and alignment with course objectives.

LEARNING OBJECTIVES

By the end of this module, students will:

- Conduct independent research on an engineering topic relevant to Bali and their home country.
- Develop a comprehensive research paper that documents their findings and analysis.
- Present project outcomes to peers and faculty, demonstrating applied engineering skills in a real-world context.

COURSE CONTENT

1. **Project Topic Selection:** Students choose a research topic or ongoing project related to their engineering specialization.
2. **Weekly Consultations:** Regular discussions with professors to review project milestones and align on goals.
3. **Case Study Application:** Analysis of a Bali-specific engineering challenge, offering comparative insights between Bali and the student's home country.
4. **Research Paper Development:** Completion of a research paper (minimum 20 pages) documenting the project's objectives, methodology, findings, and conclusions.
5. **Progress Presentations:** Students present project developments and insights in seminar sessions, receiving feedback from peers and professors.

4. INDONESIAN LANGUAGE, HISTORY & CULTURE

Lecturing Team	Gusti Ayu Made Suartika, ST., MEngSc., Ph.D., M Swanendri, ST., MT
Duration	149 hours in total
Credit Points	5 ECTS
Department	Faculty of Engineering, Universitas Udayana
Location	Sudirman Campus, Bali

COURSE DESCRIPTION

This module provides an introduction to the Indonesian language, focusing on practical communication skills and cultural understanding. Students will learn essential vocabulary, grammar, and conversational structures, including greetings, pronouns, tenses, and shopping dialogues. Additionally, the course integrates cultural elements such as Indonesian holidays and customs, giving students a well-rounded foundation in both language and cultural awareness.

LEARNING OBJECTIVES

- Use basic Indonesian vocabulary and grammar for everyday conversations, including greetings, self-introductions, and asking questions.
- Identify and utilize Indonesian pronouns, numbers, and colors in appropriate contexts.
- Construct positive, negative, and interrogative sentences in Indonesian.
- Engage in practical dialogues, such as shopping interactions and making requests, with correct language use.
- Demonstrate an understanding of Indonesian cultural elements, including holidays and traditional expressions, enhancing cross-cultural communication skills.

COURSE CONTENT

1. Indonesian greetings, self-introduction, and family members
2. Indonesian alphabet and numbers
3. Indonesian pronouns
4. Question & answer exercises
5. Positive, negative, and interrogative statements
6. Dates and holidays in Indonesia
7. Midterm test
8. Future tense usage
9. Colors and exercises on color and character arrangement
10. Human character descriptions
11. Shopping dialogues and making requests
12. Imperatives in Indonesian
13. Text comprehension with various inclusive Indonesian verbs

4. INDONESIAN LANGUAGE, HISTORY & CULTURE

ASSESSMENT

- Active participation (no less than 75% attendance)
- Assignments: 20%
- Project: 40%
- Oral Presentation: 15%
- Final Exam: 25%

5. EARTHQUAKE SCIENCE (5 CP)

Lecturing Team	I Ketut Sudarsana, ST, Ph.D, Ir. Ida Ayu Made Budiwati, MSc, Ph.D, I Gede Adi Susila, ST, MSc, Ph.D
Time	weekly
Duration	148 hours in total
Credit Points	5 ECTS
Department	Faculty of Engineering, Universitas Udayana
Location	Sudirman Campus, Bali

COURSE DESCRIPTION

Situated along the “Pacific Ring of Fire,” Indonesia experiences frequent seismic activity. This course, Earthquake Science and Engineering, addresses the fundamental concepts of earthquake dynamics and structural responses. Students will explore types of earthquakes, solutions for earthquake-resistant structures, and develop site-specific architectural principles. Emphasis is placed on seismic hazard analyses and the evaluation of various structural designs suited to earthquake-prone regions.

LEARNING OBJECTIVES

By the end of this module, students will be able to:

- Understand the nature and dynamics of ground shaking due to earthquakes.
- Analyze seismic hazards in different geographic contexts.
- Design structures that can effectively respond to earthquake forces.

COURSE CONTENT

1. **Nature of Earthquakes:** Structure of the earth, causes, tectonic plate theory, seismic waves, fault mechanisms, earthquake measurement scales, and lessons from significant events.
2. **Free-Field Surface Ground Motion:** Fourier spectra, design response spectra, elastic wave models, and near-field ground motions.
3. **Seismic Hazard Analysis:** Deterministic and probabilistic seismic hazard analysis (DSHA and PSHA) and USGS seismic hazard mapping.
4. **Seismic Response Analysis of Single Degree of Freedom (SDOF) Systems:** Motion equations, vibration response, forced vibration responses, and excitations.
5. **Numerical Evaluation of Seismic Responses:** Time-stepping methods, interpolation-based methods, Central Difference, Newmark’s, and Theta’s Wilson Methods.
6. **Earthquake Response of Linear and Nonlinear Structures:** Response Spectrum concepts, pseudo-acceleration, and yield deformation.
7. **Seismic Response Analysis of Multi Degree of Freedom (MDOF) Systems:** Eigenvalue/eigenvector analysis and forced vibration responses.
8. **Earthquake Analysis Modules:** Nonlinear static and dynamic analysis methods, including Pushover and Incremental Nonlinear Dynamic Analysis.
9. **Seismic Design of Building Codes:** Criteria and requirements of ASCE 7-10 and Eurocode-8 for buildings, performance-based earthquake engineering, and displacement-based seismic design.

5. EARTHQUAKE SCIENCE (5 CP)

REFERENCES

1. Chopra, A.K., Dynamics of Structures: Theory and Applications to Earthquake Engineering, 4th edition.
2. Clough, R.W., and Penzien, J., Dynamics of Structures, 3rd ed.
3. Humar, J.L., Dynamics of Structures.
4. Paz, M., Dynamics of Structures.
5. Naem, F. (Ed.), The Seismic Design Handbook, 2nd ed.
6. Sucuoğlu, H., and Akkar, S., Basic Earthquake Engineering: From Seismology to Analysis and Design.

ASSESSMENT

1. Active Participation: 75% minimum attendance requirement.
2. Short Assignments: 30% (individual work)
3. Student Project Presentation: 35% (group work)
4. Final Examination: 35% (individual)

6. URBAN TRANSPORTATION (5 CP)

Lecturing Team	Prof. Ir. I Nyoman Arya Thanaya, ME., Ph.D (Coordinator), Ir. I Gusti Putu Suparsa, MT Putu Alit Suthanaya, ST., MSc., Ph.D, D.M Priyantha Wedagama, ST., MT., MSc., Ph.D
Time	weekly
Duration	150 hours in total
Credit Points	5 ECTS
Department	Faculty of Engineering, Universitas Udayana
Location	Sudirman Campus, Bali

COURSE DESCRIPTION

This course introduces students to the current issues, challenges, and future prospects of urban transport in Southeast Asia, using Bali as a case study. Students will explore urban transportation planning, sustainable development, public transportation systems, and the impact of transportation on tourism. The module emphasizes real-world applications and the unique transportation needs of developing countries.

LEARNING OBJECTIVES

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

- Identify and analyze urban transport issues, challenges, and future prospects in developing countries.
- Evaluate the unique transportation requirements of Southeast Asian cities, with a focus on Bali.
- Propose sustainable solutions to improve urban transportation and address the needs of both residents and tourists.

COURSE CONTENT

1. **Urban Structure:** Concepts of urban structure development and Bali's transportation network.
2. **Road Network and Pavement:** Theory of road geometry, pavement, stakeholder roles, and road conditions in Bali.
3. **Urban Transport Institutions:** Planning, design, finance, implementation, and enforcement in Bali.
4. **Urban Transport Problems and Future Challenges:** Analysis of transportation issues in Bali with scenarios for improvement.
5. **Urban Transport and Tourism:** Impact of tourism on transportation and economic development in Bali.
6. **Sustainable Development:** Concepts and implementation of sustainable development in transportation.
7. **Public Transport:** Theories and comparisons between public transport in developed and developing countries.
8. **Public Transport in Bali:** Decline in public transport usage and a shift towards private sector solutions.
9. **State and Private Sector Transport:** Issues related to taxes, finance, routing, and trends like Go-Jek.
10. **Non-Motorised Transport Systems:** Facilities for pedestrians and people-powered vehicles.
11. **Logistic Transportation:** Theory and local logistics practices in Bali and Indonesia.
12. **Road Safety Issues:** Education, engineering, and enforcement to improve road safety.
13. **Traffic Management:** Theory, environmental impacts, and implementation in developing countries.

6. URBAN TRANSPORTATION (5 CP)

REFERENCES

1. Manheim, M.L., Fundamentals of Transportation System Analysis Volume I: Basic Concepts.
2. Meyer, M.D., Miller, E.J., Urban Transportation Planning, 2nd ed.
3. The Institution of Highways and Transportation, Transport in The Urban Environment.
4. AASHTO, A Policy on Geometric Design of Highways and Streets.
5. NAASRA, Interim Guide to Geometric Design of Rural Roads.
6. Asphalt Institute, Mix Design Methods for Asphalt Concrete and Other Hot Mix Types, 6th ed.
7. Asphalt Institute, A Brief Introduction to Asphalt and Some of Its Uses, 7th ed.
8. Krebs, R.D., and Walker, R.D., Highway Materials.

ASSESSMENT

1. Active Participation: 75% minimum attendance requirement.
2. Short Assignments: 30% (individual work)
3. Student Project Presentation: 35% (group work)
4. Final Examination: 35% (individual)

7. INDUSTRIAL TECHNOLOGY (5 CP)

Lecturing Team	NMAE Dewi Wirastuti, Ph.D (Coordinator), Linawati, Ph.D, Komang Oka Saputra, Ph.D Yoga Divayana, Ph.D
Time	weekly
Duration	149 hours in total
Credit Points	5 ECTS
Department	Faculty of Engineering, Universitas Udayana
Location	Sudirman Campus, Bali

COURSE DESCRIPTION

This course introduces various technologies that support both traditional and modern industries, focusing on the management of practical applications and challenges in electrical, computer, mechanical, and construction technologies. Students will gain insights into product styling, computer-aided manufacturing, and the use of local materials, with an emphasis on sustainable and innovative approaches to industrial technology.

LEARNING OBJECTIVES

By the end of this module, students will:

- Understand challenges associated with using technology in traditional and modern industries.
- Gain insight into green technologies and their applications in industrial settings.
- Develop the ability to design innovative projects or small business models using basic technology.

COURSE CONTENT

1. **Overview of Industrial Technology in Tropical Countries:** Role of technology in supporting the industrial sector.
2. **Traditional Industries:** Technologies in traditional industries, including Balinese traditional industries, logistics, and supply chain management.
3. **Modern Industries:** Modern technology applications in Balinese and Indonesian industries.
4. **Green Technology:** Sustainable techniques and materials, including green energy, ICT, nanotechnology, and green building practices.
5. **Entrepreneurship and Innovation:** Basics of entrepreneurship, networking, and social enterprise.
6. **Management, Business, and Leadership Strategies:** E-business, innovation management, and idea management.
7. **Electrical and Computer Technologies for Industry:** Technological support for electrical, telecommunications, and computer industries.
8. **Mechanical Technologies for Industry:** Technological support for mechanical industry applications.
9. **Construction Technologies for Industry:** Technological support for construction and architectural industries.
10. **Safety, Health & Environment:** Focus on safety equipment, hazardous materials, and environmental safety practices.
11. **Fieldwork:** Visits to traditional industry sites to observe technology applications in practice

7. INDUSTRIAL TECHNOLOGY (5 CP)

12. **Class Seminar and Student Presentation (1):** Presentation of final projects, with audience participation from local students and faculty
13. **Class Seminar and Case Studies (2):** In-depth case studies and discussions.

REFERENCES

1. Salvendy, G., Handbook of Industrial Engineering: Technology and Operations Management, 3rd ed.
2. Zhang, P., Advanced Industrial Control Technology, Elsevier.

ASSESSMENT

1. Active Participation: 75% minimum attendance requirement.
2. Short Assignments: 30% (individual work)
3. Student Project Presentation: 35% (group work)
4. Final Examination: 35% (individual)

8. MANUFACTURING PROCESS (5 CP)

Lecturing Team	Dr. I Ketut Gede Sugita, Dr. Eng. I Made Gatot Karohika
Time	weekly
Duration	149 hours in total
Credit Points	5 ECTS
Department	Faculty of Engineering, Universitas Udayana
Location	Sudirman Campus, Bali

COURSE DESCRIPTION

This course introduces students to both conventional and non-conventional manufacturing process technologies, with a particular focus on the production of gamelan musical instruments. Students will explore the metallurgy and heat treatment of materials used in gamelan, understanding how various parameters influence metal forming and casting processes.

LEARNING OBJECTIVES

By the end of this module, students will be able to:

- Understand materials in manufacturing, including casting processes theory and methods.
- Apply theories and methods related to material forming processes.
- Analyze machining processes, cutting materials, and surface quality of products.
- Develop insights into manufacturing system improvements, applying concepts and methods for optimization.

COURSE CONTENT

1. **Introduction to Foundry:** Principles and types of foundry processes.
2. **Types of Mold:** Overview of sand mold and permanent mold processes.
3. **Pattern and Mold Production:** Canal systems, melting, and mixing control.
4. **Metallurgy of Foundry Processes:** Study of solidification, segregation, and microstructures.
5. **Defects, Assessment, and Quality Control:** Identifying and managing production defects.
6. **Heat Treatment:** Methods and impact on materials.
7. **Foundry Machinery:** Equipment used in the foundry industry.
8. **Special Foundry Methods:** Advanced foundry techniques.
9. **Melting Kiln and Equipment:** Foundry layout and equipment management.
10. **Standards in Foundry Processes:** Practical standards for efficient production.
11. **Production Line Design:** Key principles in production line setup.
12. **Economic Analysis:** Cost analysis of foundry processes.
13. **Fieldwork:** Visit to a traditional Gamelan manufacturing site

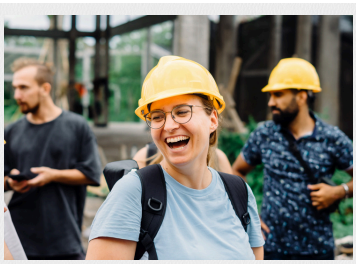
8. MANUFACTURING PROCESS (5 CP)

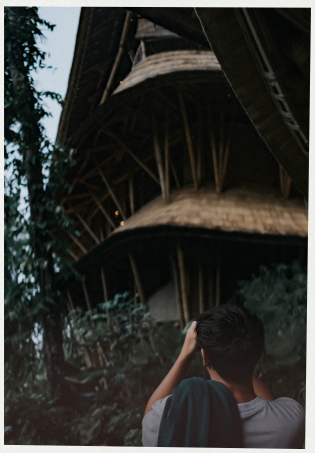
REFERENCES

1. ASM International, Casting Design and Performance, 2009.
2. Kalpakjian, S., and Schmid, S.R., Manufacturing Engineering and Technology, 7th ed., Prentice Hall, 2014.

ASSESSMENT

1. Active Participation: 75% minimum attendance requirement.
2. Short Assignments: 30% (individual work)
3. Student Project Presentation: 35% (group work)
4. Final Examination: 35% (individual)





SUSTAINABILITY
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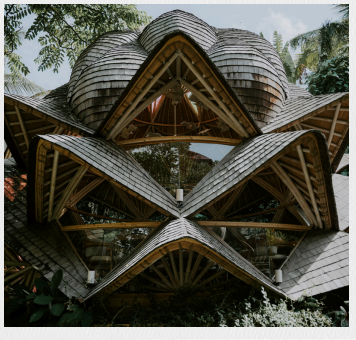

Contact Information

STUDYINBALI

Your journey begins with us! At StudyInBali, we're here to guide you through the entire process – from applications to personalized consultancy. We'll make sure everything is set before you embark on your adventure. Got questions about visas, registration, or study fees? We've got you covered – just reach out!

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