# MODUL HANDBOOK

# ERGONOMICS

Bachelor Degree Program

Department of Interior Design

Faculty of Creative Design and Digital Business

**Institut Teknologi Sepuluh Nopember**

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Description of Course Unit

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| Course unit title | Ergonomics |
| Course unit code | DI184311 |
| Type of course unit (compulsory, optional) | Compulsory |
| Level of course unit (according to EQF: first cycle Bachelor, second cycle Master) | First Cycle Bachelor |
| Year of study when the course unit is delivered (if applicable) | 2nd year |
| Semester/trimester when the course unit is delivered | 3rd |
| Number of ECTS credits allocated | 3.2 ECTS |
| Name of lecturer(s) | Dr. Ir. Susy Budi Astuti, M.T.<br>Lea Kristina Anggaeni, S.T., M.Ds. |
| Learning outcomes of the course unit | Students are able to:<br>1. Able to understand the definition, function, coverage of ergonomics and social relations, culture, aesthetics, behavior, as one solution in interior design<br>2. Able to read data information in the form of behavior, psychological culture, social, both descriptively and image and determine anthropometry data that can be used to solve a problem of design function.<br>3. Able to find effective and efficient work system run, and apply in safe and comfortable interior design for short and long period of time<br>4. Able to find problems, formulate problem solving function of design practical function based on concept and theory of ergonomics<br>5. Knowing and being able to use the national ergonomic standards in Indonesia and internationally<br>6. Able to plan, execute, analyze, find ergonommi research results and create research report ergonomics interior design<br>7. Be able to make informed and creative decisions based on the results of qualitative and quantitative data analysis.<br>8. Can work in team and responsible for the results of his work. |
| Mode of delivery (face-to-face, distance learning) | Face-to-face |
| Prerequisites and co-requisites (if applicable) | Successfully finished the Interior Technical Drawing Course with a minimum grade of C<br>Successfully finished the with Constructive drawing a minimum grade of C<br>Successfully finished or on going with the Interior Design and Aesthetic course with a minimum grade of C<br>Successfully finished or on going with the Exploration Furniture course with a minimum grade of C |
| Course content | 1. Scope of Ergonomics Studies in Interior Design<br>2. Cognitive Design: Human Capabilities and Limitations |

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| | 3. Anthropometry<br>4. Workstation |
| Recommended or required reading and other learning resources/tools | 1. Direktorat Penataan Bangunan dan Lingkungan. 2006. Peraturan Menteri Pekerjaan Umum Nomor : 30 Tahun 2006, tentang Pedoman Teknis Fasilitas dan Aksesbilitas pada Bangunan Gedung dan Lingkungan. Jakarta: Studio PBL<br>2. Goldsmith, Selwyn. 2000. Universal Design: a Manual of Practical Guidance for Architects. Oxford: Architectural Press e-Library.<br>3. Kroemer, Karl H. E. 2006. “Extra – Ordinary” Ergonomics. How To Accommodate Small and Big Persons, The Disabled and Elderly, Expectant Mothers, and Children. CA: Taylor & Francis.<br>4. Lawson, Bryan. 2001. The Language of Space. Oxford: Architectural Press e-Library.<br>5. Neufert, Ernst & Neufert, Peter. _ . Architects’ Data. Ed. 3rd. _: Blackwell Science e-Library<br>6. Pheasant, Stephen. 2003. Body Space. Anthropometry, Ergonomic and the Design of Work. Philadelphia: Taylor & Francis e-Library.<br>7. Tilley, Alvin R. and Dreyfuss, Henry. 2002. The Measure of Man and Woman. NY: John Wiley & Sons, Inc.<br>8. Bargana, S. 2018. Contemporary Ergonomics and Human Factors. CRC Press.<br>9. Bridger, R. S. 2018. Introduction to Human Factors and Ergonomics. CRC Press, Taylor & Francis Group.<br>10. Tilley, A. R. 2002. The measure of man and woman: Human factors in design. Wiley. |
| Planned learning activities and teaching methods | Problem-Based Learning, Project-Based Learning and Blended Learning |
| Language of instruction | Bahasa and English |
| Assessment methods and criteria | Assignment, Project, Quiz, Midterm Exam and Final Exam |

## Learning Outcome (LO)

| LO | Description |
|---|---|
| LO2 | Able to think critically and creatively in preparing interior design ideas/ concepts |
| LO7 | Mastering basic knowledge of aesthetics, behavior and technology in the field of interior design |
| LO9 | Mastering design concepts and able to compile reviews/ assessments on the quality of a design result |
| LO10 | Able to provide alternative solutions and make the right, creative and innovative decisions related to the field of interior design based on good leadership and communication skills |

## Course Learning Outcome (CLO)

| CLO | Description | Mapping of CLO to LO | | | | Weight of CLO (%) |
|---|---|---|---|---|---|---|
| | | LO 2 | LO 7 | LO 9 | LO 10 | |
| CLO1 | Able critical thinking in formulating interior design concepts | x | | | | 20 |
| CLO2 | Able to apply basic knowledge of aesthetics and behavior in the interior design | | x | | | 30 |
| CLO3 | Able to apply design concepts and make a review the quality of design | | | x | | 20 |
| CLO4 | Able to provide alternative solutions and make the right decisions in the interior design with good leadership and communication skills | | | | x | 30 |

Asessment Plan

| No. | Course Learning Outcomes* | Asessment Technique | Asessment Weight (%) |
|---|---|---|---|
| 1. | **CLO1**<br>Able of critical thinking in formulating interior design concepts<br>**CLO2**<br>Able to apply basic knowledge of aesthetics and behavior in the interior design<br>**CLO3**<br>Able to apply design concepts and make a review the quality of design | The five senses in design considerations (Case Method) | 35 |
| 2. | **CLO1**<br>Able of critical thinking in formulating interior design concepts<br>**CLO2**<br>Able to apply basic knowledge of aesthetics and behavior in the interior design<br>**CLO4**<br>Able to provide alternative solutions and make the right decisions in the interior design with good leadership and communication skills | Anthropometrics of bedroom (Case Method) | 40 |
| 3. | **CLO1**<br>Able of critical thinking in formulating interior design concepts<br>**CLO2**<br>Able to apply basic knowledge of aesthetics and behavior in the interior design<br>**CLO4**<br>Able to provide alternative solutions and make the right decisions in the interior design with good leadership and communication skills | Workstation in residential dwellings (Case Method) | 25 |
| | | Total Assessment Weight | 100 |

Learning Outcome Plan

| Week | Sub Achievement-Subject Final Ability | Breadth (Learning Material) | Learning Method | Estimated Time | Students Learning Experience | Assessment Criteria and Indicator |
|---|---|---|---|---|---|---|
| 1 | Able to understand the ergonomic relationship to the design of interior space and accessories. | 1. Introduction to ergonomics, human factors and design.<br>2. Basic anthropometric data and their relation to circulation<br>3. Physiological body as a measuring tool<br>4. Read descriptive data (writing) and images | Introductory Lecture, Discussion of Questions & Practices.<br>1. Shows basic anthropometric data with respect to human standing and range<br>2. Shows how to read anthropometric data<br>3. Read and use the physiological body as a simple measuring tool<br>4. Explain the data link to interior design: circulation<br><br>Task 1 :<br>Determine circulation between doors and analyze free space from various door points. | SL : 2x(1x60")<br>IL:<br>1x(1x60") | - Students are able to understand the definition of ergonomics, function and coverage of ergonomics, human factors, and furniture / aesthetic elements in space.<br>- Students are able to understand the role of ergonomics in interior design<br>- Students are able to utilize the physiological body as a simple measuring tool<br>- Students feel comfortable circulation with simple practice when walking and standing<br>- Students have a picture of the comfort and safety of circulation | Exactly in analyzing anthropometric data about distance. |
| 2 | Students are able to determine the right anthropometry data to be used as reference for designing lay out interior | Introduction to theory and how to read anthropometry data and its application to the interior, related to:<br>1. Circulation<br>2. Lay out<br>3. Lighting and airing | Introductory Lecture, Discussion of Q & A, Practice and Presentation of 3 students<br>1. Designated students present the results of the Task 1 analysis. | SL : 2x(1x60")<br>IL:<br>1x(1x60") | - Students are able to understand the various position of door point and free access to circulation<br>- Students are able to determine the right lay out of furniture | Students are able to determine the free access, lay out furniture and lighting elementsand proper aircraft. |

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| | | 4. Read descriptive data (writing) and images | 2. Shows basic anthropometric data with respect to human standing distance and range<br>3. Shows how to read anthropometric data<br>4. Explain the relation of the data to the interior design: circulation, lay out, lighting and penghawaan<br><br>Exercise 2:<br>Arranging lay out of simple furniture in 1 room (floor plan given) | | - Students are able to determine the location of lighting and penghawaan<br>- Students are able to present their analysis results well | |
| 3 | Students understand the role of the human senses and their relation to the interior | Introduction to the theory and how to read anthropometric data and its application to the interior:<br>1. Human Sense<br>2. Aesthetic Elements<br>3. Read descriptive data (writing) and drawings | Introductory Lecture, Discussion of Q & A, Practice and Presentation of 3 students<br>1. Designated students present the results of the exercise analysis 2.<br>2. Showing the role of the human senses to design<br>3. Shows the ability of the eye based on the physiological human distance and the ability to see<br>4. Explain how to analyze the role of human senses in designing the aesthetic elements of the interior<br><br>Task 3: | SL : 2x(1x60")<br>IL:<br>1x(1x60") | - Students are able to understand the role of human senses in the interior<br>- Students are able to determine the distance and the amount of aesthetic elements<br>- Students can read descriptive data (writing) and drawings<br>- Students are able to present their duties well. | Students are able to determine the sensory relations of vision to distance, size and application on aesthetic elements - interior envelope. |

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| | | | Analyze lay out design tasks. | | | |
| 4, 5 | Students are able to perform functional analysis, understand the problems and create design solutions to optimize the interior space. | Review Assignment 3 | Student presentations and discussions.<br>1. Designated students present their first assignment.<br>2. Discuss the results of the student presentation | SL : 3x(1x60")<br>IL: -- | Students are able to utilize anthropometry data and determine the data used in making lay out design<br>Students are able to present their duties well. | Students are able to utilize anthropometric data in their design. |
| 6 | Students can understand the standardization, user character and style in designing seating. | Introduction and knowledge of furniture - a means of sitting:<br>1. Different types and ways of sitting<br>2. Ergonomic relationship to the furniture design of the sitting facilities<br>3. Physiological and cultural approaches<br>4. Data used to make furniture means of sitting | Introductory lectures, discussions & practices.<br>1. Ask students to do 10 positions sitting on their stools and analyze posture, as well as space comfort<br>2. Show the various types of seating and seating<br>3. Explain the anthropometric data used for the sitting facilities.<br>4. Analyze 5 seat designs on the market. | SL : 2x(1x60")<br>IL:<br>1x(1x60") | - Students are able to show various ways of sitting<br>- Students are able to feel comfortable and safe sitting<br>- Students are able to determine the height dimension of comfortable and safe seating for Indonesian standards | The precise determination of anthropometric data in designing the seating means. |
| 7 | Students are able to use ergonomic data to design the kitchen set according to work system, comfort security, space and lifestyle of user. | Introduction and Knowledge of 'Kitchen Set' furniture<br>1. Introduce the concept of effective, efficient and safe working system<br>2. Physiological and cultural approaches in Indonesia<br>3. Approach of electronic products in the market | Introductory lectures, discussions, & practices.<br>1. Explain habits and work systems in the kitchen area.<br>2. Explain the layout layout is effective, efficient and safe.<br>3. Show the various types of lay out in the kitchen area.<br>4. Describes | SL : 2x(1x60")<br>IL:<br>1x(1x60") | - Students are able to explain the working system demands in the kitchen<br>- Students are able to determine lay out kitchen set in accordance with the work system, needs, space and lifestyle of the user. | The accuracy of determining anthropometric data in designing kitchen set. |

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| | | | anthropometric data in use<br><br>Exercise 4:<br>Divide students into 10 groups, each group consists of 3 students, to search data and analyze data on Special Ergonomics for Children (Toddler-Children), Elderly, Difabel (Wheelchair and Autism - hyperactive | | - Determine the dimensions of kitchen set | |
| 8 | Mid Exam | | 1. Analyzing data in the form of behavioral, psychological and child behavior description and translating in the lay out of the child's sleeping space refers to ergonomics to the human senses, distance, circulation, lay out of furniture, aesthetic elements and furniture means of sitting.<br>2. Make 2 design perspectives being made | SL : --<br>IL: 3x(1x60”) | | Students can read descriptive data and lay out the layout optimally viewed from the perspective and the proportion of children. |
| 9 | Able to use research methods for ergonomics as one solution for interior | Research methods for ergonomics:<br>1. Introduction to research for | Lectures, discussions and assistance for final exam.<br>1. Explain the | SL : 2x(1x60”)<br>IL:<br>1x(1x60”) | - Students are able to understand research methods in ergonomics | Students always apply ergo-design in terms of culture, user behavior, material and |

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| | designing. | ergonomics<br>2. Quantitative research approach<br>3. Data analysis approach based on visual perception<br>4. Determination of respondents, question types and data processing of questionnaire results | relationship between Ergo-Design on culture, user behavior, material and environment<br>2. Demonstrate the benefits of application of culture, user behavior, materials and environment in the design<br><br>BIG TASK OF FINAL EXAM<br>Create ppt paper and presentation format. a group of 3 people with special ergonomic themes and applications on interior design. | | - Students can determine the respondent correctly<br>- Students are able to compile questions<br>- Students are able to analyze kusioner data correctly<br>- Students can apply data in the design process | environment<br>in designing the interior space along with the completeness |
| 10 | Able to design interior space related to children's users. | Special Ergonomics 'Children':<br>2. Introduction to the special ergonomics of children<br>3. Child's physiological approach<br>4. Child psychological approach<br>5. Application on furniture design for children<br>6. Applications on interior design for children | Introductory lectures, presentation discussions and final exam duties assistance.<br>1. Student presentation of the results of his analysis<br>2. Explain the physiological, psychological and behavior of the child<br>3. Show the data application on interior design<br>4. Shows the interior space using the data<br>5. Assistance task final exam great | SL : 2x(1x60")<br>IL:<br>1x(1x60") | - Students are able to find and analyze data about antropometry, behavior and psychological of children<br>- Students can utilize the above data to be applied in furniture design and interior space<br>- Students can find characteristic design for children | Students can utilize child data analysis on interior design for children |
| 11 | Able to design interior | Special Ergonomics | Introductory lectures, | SL : 2x(1x60") | - Students are | Students can utilize |

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| | space associated with elderly users. | 'Elderly':<br>1. Introduction of Elderly ergonomics<br>2. Elderly physiological and psychological approach<br>3. Application on interior design and furniture for Elderly | presentation discussions and final exam assignment consultation.<br>1. Student presentation of the results of his analysis<br>2. Explain the physiological, psychological and behavior of the Elderly<br>3. Show the data application on interior design<br>4. Shows the interior space using the data<br>5. Final exam project consultation. | IL:<br>1x(1x60”) | able to find and analyze data about anthropometry, behavioral and psychological elderly<br>- Students can utilize the above data to be applied in furniture design and interior space<br>- Students can find the characteristic design for the elderly that accommodate the needs of the elderly | Elderly data analysis on interior design to facilitate elderly needs. |
| 12 | Able to design interior space related to wheelchair users. | Special Ergonomics 'Physical Disabled - Wheelchairs':<br>1. Introduction to the special ergonomics of wheelchair users<br>2. Physiological and psychological approach of wheelchair users<br>1. 3. Applications on furniture design and interior space for wheelchair users | Introductory lectures, presentation discussions and final exam assignment consultation.<br>1. Student presentation of the results of his analysis<br>2. Explain the physiological, psychological and behavior of wheel chair user.<br>3. Show the data application on interior design<br>4. Shows the interior space using the data<br>5. Final exam project consultation | SL : 2x(1x60”)<br>IL:<br>1x(1x60”) | - Students are able to find and analyze data about anthropometry, behavior and psychology of wheelchair users<br>- Students can utilize the above data to be applied in furniture design and interior space<br>- Students can find design characteristics for wheelchair users that accommodate their physical needs and limitations | |

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| 13 | Able to design the interior space associated with Children with disabilities users - Hyperactive Autism | Special Ergonomics 'Diffable - Autism-Hyperactive':<br>1. Introduction of Autism- children with disabilities Hyperactive ergonomics<br>2. Physiological and psychological Approach of Autism-Hyperactive Children<br>3. Application on furniture design and interior space for Autis-children with disabilities Hyperactive | Introductory lectures, presentation discussions and final exam assignment consultation.<br>1. Student presentation of the results of his analysis<br>2. Explain the physiological, psychological and wheelchair user space requirements<br>3. Show the data application on interior design<br>4. Shows the interior space using the data<br>5. Final exam project consultation | SL : 2x(1x60")<br>IL:<br>1x(1x60") | - Students are able to find and analyze data about anthropometry, behavioral and psychological children with disabilities with diagnosis 'Autism-hyperactive'<br>- Students can utilize the above data to be applied in furniture design and interior space<br>- Students can find a safe design and help grow the flower and independence of users children with disabilities 'Autis - Hyperactive' | |
| 14 - 16 | Able to utilize knowledge in the field of ergonomics in making research and interior designing | Assignment Presentation | Presentation dan submission of final project. | | | Students understand theories, be able to select and use data to provide design solutions to the design. |

REFERENCES (max 5):


1. Direktorat Penataan Bangunan dan Lingkungan. 2006. *Peraturan Menteri Pekerjaan Umum Nomor : 30 Tahun 2006, tentang Pedoman Teknis Fasilitas dan Aksesbilitas pada Bangunan Gedung dan Lingkungan.* Jakarta: Studio PBL
2. Goldsmith, Selwyn. 2000. *Universal Design: a Manual of Practical Guidance for Architects.* Oxford: Architectural Press e-Library.
3. Kroemer, Karl H. E. 2006. *"Extra – Ordinary" Ergonomics. How To Accommodate Small and Big Persons, The Disabled and Elderly, Expectant Mothers, and Children*. CA: Taylor & Francis.
4. Lawson, Bryan. 2001. *The Language of Space*. Oxford: Architectural Press e-Library.
5. Neufert, Ernst & Neufert, Peter. _ . *Architects' Data. Ed. 3rd.* _: Blackwell Science e-Library
6. Pheasant, Stephen. 2003. *Body Space. Anthropometry, Ergonomic and the Design of Work*. Philadelphia: Taylor & Francis e-Library.
7. Tilley, Alvin R. and Dreyfuss, Henry. 2002. *The Measure of Man and Woman.* NY: John Wiley & Sons, Inc.

Notes:
* Presentation
1 credit = (50’ L/M + 60’ SL + 60’ IL)/Week
IL = Independent Learning
T = Theory (knowledge)
L/M = Meeting (Lecture)
PS = Practical Simulation (3 hours/week)
P = Practice (Skillfulness aspect)
SL = Structured Learning
LP = Laboratory Practice (3 hours/week)