MASTER OF MECHANICAL ENGINEERING EDUCATION

MODULE HANDBOOK

2020

FACULTY ENGINEERING
UNIVERSITAS NEGERI YOGYAKARTA

UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF ENGINEERING
MASTER OF EDUCATION IN MECHANICAL ENGINEERING
Jalan Colombo Nomor 1 Yogyakarta 55281 Phone: (0274)550836,
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MASTER OF EDUCATION
IN MECHANICAL ENGINEERING

MODULE HANDBOOK

Module name	Phylosophy of Science
Module level, if applicable	Graduate
Code	PPS 8201
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	1st Semester
Module coordinator	Dr. Wagiran, M.Pd.
Lecturer(s)	Dr. Wagiran, M.Pd.
Language	Indonesian and English
Classification within the curriculum	Common Courses in Foundational Science
Teaching format / class hours per week during the semester	100 minutes lectures, Blended Learning (Face to face and E-Learning) 120 minutes, 120 minutes structured activities per week
Workload	90.7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: Internalize value, norm, and academic ethic CO2: indicate responsible and independent behavior towards the assigned work CO3: communicate effectively, think critically, and create decision to solve problem in vocational education appropriately. CO4: implement thinking principles and scientific metodologhy to obtain scientific validity in the context of the area of the expertise and vocational knowledge of mechanical engineering.

<table>
<tr><td>Content</td><td>This course contains two credit points. It equips students to understand philosophy (ontology, epistemology, and axiology), science and knowledge, philosophy of science and another scope of philosophy of science. Moreover, students will deepen their understanding towards the scope of scientific thinking, scientific methods, theory of truth, and scientific truth. Furthermore, students will get experience in the implementation and implication of philosophy of science in the scientific methods or research methodology and the implementation to develop scientific scope in the area of mechanical engineering education study program.</td></tr>
<tr><td>Study/exam achievement</td><td>To achieve the program learning outcomes, the evaluation is conducted through quiz, individual assessment, group work, midterm and final semester test.
<table>
<tr><th>No</th><th>CO</th><th>Assesment Object</th><th>Assesment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="4">● Individual assignment
● = 30%
● Mid exam = 25%
● Final exam = 35%
● Attitude = 10%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignme
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignment</td><td>Written test</td></tr>
</table></td></tr>
<tr><td>Media</td><td>PowerPoint and digital learning sources</td></tr>
<tr><td>Literature</td><td>1) Noeng Muhadjir. (2006). Filsafat ilmu: Kualitatif & kuantiatif untuk pengembangan ilmu dan penelitian. Edisi IV. Yogyakarta: Rake Sarasin (NM).
2) Tim Dosen Filsafat Ilmu UGM. (2010). Filsafat Ilmu: Sebagai dasar pengembangan ilmu pengetahuan. Yogyakarta: Liberty. (TD)
3) Bambang Sugiarto. (1996). Postmodernisme: tantangan bagi filsafat. Yogyakarta: Kanisius. (BS).</td></tr>
</table>

	4) Jujun S. Suriasumantri. (2001). Ilmu dalam perspektif, Jakarta: Yayasan Obor Indonesia. (JS) 5) Walters, J. Donald. (2003). Crises in modern thought. (Menyelami kemajuan ilmu pengetahuan dalam lingkup filsafat dan hukum kodrat). Alih bahasa oleh B. Widhi Nugraha. Jakarta: Gramedia Pustaka Utama. **(WD**).

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1	√								
CO2	√								
CO3		√							
CO4		√							

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Statistics
Module level, if applicable	Graduate
Code	PPS 8202
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	1st
Module coordinator	Dr. Sudiyatno, M.E.
Lecturer(s)	Dr. Sudiyatno, M.E.
Language	Indonesian and English
Classification within the Curriculum	Common Courses on Foundational Science
Course Design	100 minutes for lectures, 120 minutes for Blended Learning (Face to face and e Learning), and 120 minutes for structured activities per week
Workload	90,7 hours per semester consisting of 100 minutes for lectures, 120 minutes for structured activities, and 120 minutes for independent learning per week for 16 weeks.
Credits	2
Prerequisites course(s)	-
Course Outcomes	At the end of the course, the students are expected to be able to: CO1: master the statistic concept and able to implement the knowledge in conducting educational research on mechanical engineering (PLO7) CO2: design statistical concept of research project (PLO8) CO3: present statistical concept for scientific works in national seminars and/or international seminars (PLO9)
Content	This subject discusses the role of statistics in the field of research, probability theory, the characteristics of the statistical distribution and the widely used sampling distribution. The contents of the course include understanding the basic concepts of statistics, applying statistical concepts, analyzing statistical methods. Furthermore, the students are expected to be able to present statistical concepts in scientific works for national or international seminars.

<table>
<tr><td>Course Weight</td><td>The course weight will be divided as follows:
<table>
<tr><th>No</th><th>CO</th><th>Object of Assessment</th><th>Technique of Assessment</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Individual assignment</td><td>Test</td><td rowspan="3">Individual assignment: 50%

Portfolio : 50%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Individual assignment</td><td>Observation sheet</td></tr>
<tr><td>3</td><td>CO3</td><td>● Individual assignment</td><td>Presentation & Portfolio</td></tr>
</table></td></tr>
<tr><td>Media</td><td>Video conference, LMS E-learning besmart.uny.ac.id</td></tr>
<tr><td>Literature</td><td>1) Bluman, allan G. (2012). Elementry Statistics: A Step by Step Approach, 8th edition, New York: McGraw-Hill
2) psychology. Englewood Cliffs, New Jersey: Prentice Hall, Inc.
3) Leech, Nancy L., Barret, K.C., & Morgan, G.A. (2005). SPSS for Intermidiate Statistics: Use and Interpretation, 2nd Ed. New Jersey: Lawrence Erlbaum Associates, Publishers
4) Triola, Mario F., (2008). Elementary Statistics, 11th Edition, New York: Addion-Wesley</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1							√		
CO2								√	
CO3									√

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Research Methodology
Module level, if applicable	Graduate
Code	PPS 8203
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	1st Semester
Module coordinator	Dr. Zainur Rofiq, M.Pd.
Lecturer(s)	Dr. Zainur Rofiq, M.Pd.
Language	Indonesian and English
Classification within the curriculum	Common Courses on Foundational Science
Teaching format / class hours per week during the semester	150 minutes lectures, Blended Learning (Face to face and e Learning) 180 minutes, 180 minutes structured activities per week
Workload	136 hours per semester consisting of 150 minutes lectures, 180 minutes structured activities, and 180 minutes self-study per week for 16 weeks.
Credit points	3
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: develop the theoretical concept of mechanical engineering vocational learning research methodology. (PLO2) CO2: develop the application concept of mechanical engineering vocational learning research methodology. (PLO2) CO3: formulate research methodology in mechanical engineering vocational learning (PLO7) CO4: create scientific ideas and arguments for research methodology in the field of mechanical engineering vocational (PLO8)
Content	This course weighs 3 credits. This course describes knowledge about educational research methods and their application in solving educational problems. A general description of the research method includes: (1) types of research; (2) stages of research; (3) identification of research variables; (4) topic selection and research problem formulation; (5) preparation of literature review and

<table>
<tr><td></td><td>formulation of research hypotheses, (6) population and samples; (7) data collection methods and instruments; (8) measurement scale; (9) data analysis, interpretation of data analysis results and discussion of research results, (10) qualitative research methodology, and (11) drafting a thesis proposal.</td></tr>
<tr><td>Study/exam achievement</td><td>Learning evaluation is carried out by: quizzes, individual assignments, midterm exams, and final semester exams. Quizzes are in the form of essay tests at the end of the meeting, assignments, presentations, work on questions for midterm and final semester exams.
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td><td rowspan="4">Quiz = 20%
Individual assignment= 30%
Mid exam = 20%
Final exam = 30%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4.</td><td>CO4</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td><td></td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>PPT presentation and LCD projector</td></tr>
<tr><td>Literature</td><td>1) Bablie, E, The Practice of Social research (10th ed.), USA, Thomson, Wadswort, 2004.
2) Gall, M. D. & Borg, W. R, Educational research, an introduction, Boston, Pearson Education, Inc., 2003.
3) Neuman, W. L, Social research methods, qualitative and quantitative approaches (5th), Boston, Pearson Education Inc., 2003.</td></tr>
</table>

	4) Singleton, R. A. & Strait, B. C, Approaches to social research (3rd).], New York, Oxford University Press, 1999.

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1		√							
CO2		√							
CO3							√		
CO4								√	

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Vocational Education and Training Management
Module level, if applicable	Graduate
Code	MES 8201
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	1st
Module coordinator	Prof. Dr. Thomas Sukardi, M.Pd.
Lecturer(s)	Prof. Dr. Thomas Sukardi, M.Pd.
Language	Indonesian and English
Classification within the curriculum	Compulsory Specific Courses
Teaching format / class hours per week during the semester	100 minutes lectures, 120 minutes Blended Learning (Face to face and e Learning), 120 minutes structured activities.
Workload	90.7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: understand and develop various theories related to education and training management, plan vocational education and training, organize training, organize vocational education and training, lead training, control the quality of education and training, and evaluate education and training. CO2: assemble proposals for vocational education and training activities in formal schools/community/and non-formal education which contain some selected activities, objectives, methods, media trainings, structured programs, organizational structures and division of tasks, budget and evaluation of education and training programs. CO3: arrange field visit report.

<table>
<tr><td>Content</td><td>This course provides students with the following abilities: (1) to understand the basic concepts of education and training management and apply the management functions in managing training resources; (2) planning education and training programs starting from the analysis of training needs and curriculum development; (3) identify various strategies and instructional media for training; (4) identify education and training resources management strategies which include human resources, facilities and infrastructures and training funding; (5) understand various training leadership models, quality control of education and training, and evaluate education and training. The course implements andragogical approach that emphasizes independent learning and field studies. The final score is graded from students' attendance, active participation in class, midterm exam, weekly assignment and presentation of field visit result, proposal for training activities and final semester exam.</td></tr>
<tr><td>Study/exam achievements:</td><td>The final mark will be weight as follow:
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td rowspan="5">1</td><td rowspan="5">CO1
CO2
CO3</td><td>a. Presence</td><td>Written data</td><td>10%</td></tr>
<tr><td>b. Individual Assignment and Quiz</td><td>Written test, Discussion, Presentation</td><td>20%</td></tr>
<tr><td>c. Group Assignment and Performance</td><td>Written test, Discussion, Presentation</td><td>20%</td></tr>
<tr><td>d. Mid-term Exam</td><td>Written test</td><td>20%</td></tr>
<tr><td>e. Final Exam</td><td>Written test</td><td>30%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>Board, LCD Projector, Laptop/Computer, Video conference, LMS E-learning besmart.uny.ac.id</td></tr>
<tr><td>Literature</td><td>1) Department for Business Innovation and Skills (BIS). (2010), Guidelines for managing programmes. London: © Crown copyright 2010. Diperoleh dari http://www.bis.gov.uk
2) Desler, G. (2015). Human Resource Management. Florida International University: Prentice Hall Pearson
3) Fandy, Tj & Diana, A. (2003). Total Quality Management. Yogyakarta: Andi Offset
4) Hasan Basri dan Rusdiyana. Manajemen Diklat. Pustaka Setia
5) Kirkpatrick, D. L. 1998. Evaluating Training Programs: The Four Levels. San Francisco: Berrett-Koehler Publisher, Inc
6) Kotler, P., & Keller, K.L. (2012). Marketing Management. Harlow, Boston MA: Pearson Education
7) Oakland. (1993). Total quality management. Oxford: Butterworth-Heineman</td></tr>
</table>

	8) Sallis, E. (1993) Total quality management in education. London: Kogan Page 9) Suharsimi & Lia Yuliana. 2009. Manajemen Pendidikan. Yogyakarta: Aditya Media

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1		√					√		
CO2		√					√		
CO3		√					√		

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Vocational Education Curriculum Development
Module level, if applicable	Graduate
Code	MES 8202
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	2nd
Module coordinator	Dr. Wagiran, M.Pd
Lecturer(s)	Dr. Wagiran, M.Pd
Language	Indonesian and English
Classification within the curriculum	Compulsory courses
Teaching format / class hours per week during the semester	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload	90,7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: understand and analyze the concept of vocational curriculum planning in the field of mechanical engineering CO2: understand and analyze the concept of vocational curriculum implementation in the field of mechanical engineering CO3: evaluate mechanical engineering vocational curriculum in vocational school and training institution. CO4: formulate problems solving in vocational curriculum development of mechanical engineering.
Content	This course facilitates student with the ability to understand and analyze about the concept of planning, implementing, and evaluating curriculum and develop curriculum of technological and vocational education. The course contains materials related to definition, dimensions, functions, and roles of the curriculum; the

<table>
<tr><td></td><td>foundation of curriculum development; the component of curriculum development; the principles of curriculum development; the models of curriculum development and organization; approaches, strategies, and models of technological and vocational learning. The course is delivered by lecturing, classroom and group discussions equipped with observation and critical analysis assignments towards technical and vocational education curriculum development practices.</td></tr>
<tr><td>Study/exam achievement</td><td>Learning evaluation is carried out by: quizzes, individual assignments, group assignments, structured assignments, paper writings
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="4">All assignment: 60%
Mid semester: 20%
Final exam: 15 %
Attitude (presence in course): 5 %</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Group assignment
● Paper (Mid semester)</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Individual assignment
● Group assignment
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Individual assignment
● Group assignment
● Final exam</td><td>Written test</td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>Slide presentation and digital resources from website</td></tr>
<tr><td>Literature</td><td>1) Finch, C.R & Crunkilton, J.R. (1999). Curriculum Development in Vocational and Technical Education (fifth edition). Massachusetts: Allyn and Bacon
2) Olive, P.F. (1992). Developing the Curriculum (third edition). New York: Harper Collins Publishers
3) Bean, J.A., Toefr, C.F., & Alessi, S.J. (1986). Curriculum Planning and Development. Massachusetts: Allyn and Bacon
4) Thompson, J.F. (1993). Foundation of Vocational Education. New Jersey: Prentice Hall</td></tr>
</table>

	5) Sukamto. (1988). Perencanaan & Pengembangan Kurikulum Pendidikan Teknologi dan Kejuruan. Jakarta: Dikti 6) Sukamto. (2001). Perubahan Karakteristik Dunia Kerja dan Revitalisasi Pembelajaran dalam Kurikulum Pendidikan Kejuruan. Pidato Pengukuhan Guru Besar. Yogyakarta: UNY 7) Ella Yulaelawati. (2004). Kurikulum dan Pembelajaran. Jakarta: Pakar Raya 8) Pardjono, Wardan Suyanto, dan Satunggalno. (2003). Pendidikan Kejuruan dengan Kurikulum Berbasis Kompetensi Berorientasi Kecakapan Hidup. Makalah. Disampaikan dalam Lokakarya Pembelajaran dengan KBK Berorientasi Kecakapan Hidup tanggal 29 dan 30 April 2003 di Fakultas Tekik Universitas Negeri Yogyakarta 9) CD Bahan Sosialisasi Kurikulum Berbasis Kompetensi 10) CD Sosialisasi Kurikulum Tingkat Satuan Pendidikan 11) CD Sosialisasi Kurikulum 2013 12) Handout

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1		√							
CO2		√							
CO3							√		
CO4							√		

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Vocational Learning Model
Module level,if applicable	Graduate
Code	MES 8203
Sub-heading,if applicable	-
Classes,if applicable	-
Semester	2nd
Module coordinator	Dr. Widarto, M.Pd.
Lecturer(s)	Dr. Widarto, M.Pd.
Language	Indonesian and English
Classification within the Curriculum	Compulsory courses
Teaching format / class hours per week during the semester	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload	90,7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Creditpoints	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: analyze the theoretical concepts and applications of the mechanical engineering vocational learning model (PLO2) CO2: design and conceptualize a mechanical engineering vocational learning model (PLO2) CO3: apply the learning model to solve problems in mechanical engineering vocational learning (PLO7) CO4: evaluate the application of learning model in mechanical engineering vocational learning (PLO7)
Content	The Vocational Learning Model course weighs 2 credits. This course will provide provisions for students in the Mechanical Engineering Master Program in various modern active learning models that are widely applied in Vocational High Schools (SMK). The lecture will start with theories and facts about the human brain; multiple intelligence; vocational learning philosophy; prosser theory; characteristics of vocational education; and features of vocational education. Students are then

<table>
<tr><td></td><td>invited to practice directly through a Learning Model simulation: Project Work Learning, Contextual Teaching and Learning (CTL), Quantum Teaching and Learning (QTL), Problem-Based Learning (PBL), Inquiry Training Teaching Model, Role Playing Model and Lesson Study Simulation. At the end of the lecture, students are required to analyze the problems of mechanical engineering vocational learning. Based on the existing problems, students design and apply learning models and evaluate them.</td></tr>
<tr><td>Study/exam echievement</td><td>Learning evaluation is carried out by: quizzes, individual assignments, midterm exams, and final semester exams. The quiz is a multiple choice test at the end of the meeting. The individual assignment is to design the concept of a vocational learning model and report its implementation and evaluation. Midterm and final semester exams are in the form of essay tests.
<table>
<tr><th>No</th><th>CO</th><th>Assesment Object</th><th>Assesment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td><td rowspan="4">Quiz = 15%
Individual assignment= 40%
Mid exam = 20%
Final exam = 25%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignme
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignment</td><td>Written test</td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>Module, whiteboard, LCD projector, laptop / computer, video conference, LMS E-learning besmart.uny.ac.id</td></tr>
<tr><td>Literature</td><td>1) Anderson, Lorin W. (1989). The Effective Teacher: Study Guide and Reading. New York: McGraw-Hill Publishing Co.
2) Cotterill & Pamela, (2007). 21th Century Education. Netherlands: Springer
3) Gagne, N.L. (2009). A Conception of Teaching. New York: Springer.
4) Gagnon, R. (2009). Competency, Meaningful Learning and Learning Styles in TVET. New York: Springer.
5) Klein, Stephen B. (2002). Learning: Principles and Application. New York: McGraw-Hill Publishing Co.</td></tr>
</table>

	6) Medsker, K. & Holdsworth, K. (2001). Models and Strategies for Designing Training. Silver Spring, Maryland: International Society for Performance Improvement. 7) Miguel, L., & Kagan, S. (2006). Cooperative Learning Structures for Team Building. Jakarta: Grasindo.

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1		√							
CO2		√							
CO3							√		
CO4							√		

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Vocational Learning Evaluation
Module level, if applicable	Graduate
Code	MES 8204
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	2nd
Module coordinator	Prof. Dr. Sudji Munadi, M.Pd
Lecturer(s)	Prof. Dr. Sudji Munadi, M.Pd
Language	Indonesian and English
Classification within the Curriculum	Compulsory courses
Teaching format / class hours per week during the semester	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload	90.67 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: master the concept of testing, measurement, assessment and evaluation in-depth (PLO2) CO2:apply learning evaluation models, develop the evaluation instruments and analyze the validity and reliability of the instruments (PLO7)
Content	This subject discusses Vocational Learning Evaluation including the concepts of learning evaluation, and types of learning evaluation (such as CIPP, Stake Scriven, etc), types of assessment, validity, reliability, how to develop test items, item analysis, and theoretical and empirical item analysis using relevant program (software) such as ITEMAN. The course is delivered in the form of lectures, questions and answers, discussions, assignments, presentations, and practice.

<table>
<tr><td>Study/exam achievement</td><td colspan="5">The learning evaluation is carried out by conducting individual assignments, presentations, and portfolio assignments.
<table>
<tr><td>No</td><td>CO</td><td>Assessment Object</td><td>Assessment Technique</td><td>Weight</td></tr>
<tr><td>1</td><td>CO1</td><td>● Individual assignment
● Group Assignment</td><td>Oral presentation and Test</td><td rowspan="2">Individual assignment: 30%
Group Assignment: 20%
Document assessment: 50%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Individual assignment</td><td>Oral presentation and document assessment</td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td colspan="5">Video conference, LMS E-Learning besmart.uny.ac.id</td></tr>
<tr><td>Literature</td><td colspan="5">1) Moore, B Stanly, T. (2010). Critical thinking and formative assessments. Larchmount. NY: Eye on Education, Inc. Disingkat MS.
2) Salkind, N.J. (2013). Test & measurement for people who hate test & measurement. California: SAGE Publication, Inc. Disingkat SN
3) Stigin, R and Chapuis, J. (2012). Introduction to student involved assessment for learning 2nd edition. Boston: Addison Wesley. Disingkat SC.
4) Fitzpatrick, J.L, Sanders, J.R, and Worthen B.R. (2011). Program evaluation: Alternative approach and practical guidelines. New York: Pearson Education. Inc. Disingkat FSW
5) Reynolds, C.R., Livingston, R.B dan Wilson, V. (2008). Measurement and assessment in education. Englewood Ciffs, NJ: Prentice-Hall, Inc. Disingkat RLW</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1		√							
CO2							√		

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Metal Welding and Fabrication Technology
Module level, if applicable	Graduate
Code	MES 8205
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	2nd
Module coordinator	Dr. Ir. Mujiyono, W. Eng, M.T. IPM
Lecturer(s)	Dr. Ir. Mujiyono, W. Eng, M.T. IPM
Language	Indonesian and English
Classification within the curriculum	Compulsory Courses
Teaching format / class hours per week during the semester	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload	90,7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: plan a metal forming process based on the shape of the work piece (PLO 4) CO2: prepare specifications for welding procedures (PLO 6) CO3: plan material testing and weld joints (PLO 6) CO4: determine the welding process based on the needs of manufacturing machine components (PLO 6) CO5: create a welding joint design for the machine component manufacturing process (PLO 8)
Content	The Metal Welding and Fabrication Technology course weighs 2 credits. This course equips students to be able to analyze and select a welding process, make welding work steps and test them based on welding standards such as ASME, AWS, and other standards used in the industrial world. This course also contains material formation.

<table>
<tr><td>Study/exam achievement</td><td>Learning evaluation is carried out by: quizzes, individual assignments, midterm exams, and final semester exams. The quiz is a multiple choice test at the end of the meeting. The assignment includes making specifications for welding procedures. Working on questions is for midterm and final semester exams.
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="5">Quiz = 20%
Individual assignment= 30%
Mid exam = 20%
Final exam = 30%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignment</td><td>Written test</td></tr>
<tr><td>5</td><td>CO5</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>Board, LCD Projector, Laptop/Computer.</td></tr>
<tr><td>Literature</td><td>1) O’Brien, R.L., (1991). Welding Handbook: Welding Processes. American Welding Society, Miami, USA.
2) Oates, W.R., (1996). Welding Handbook: Materials and Applications. American Welding Society, Miami, USA.
3) Smith, SD. (1984). Welding Skill and Technology. Mc.Graw-hill handbook company. New York, USA
4) Dieter, G.E. (1988). Mechanical metallurgy McGraw-Hill, ISBN 0-07-100406-8., SI metric edition,McGraw-Hill, ISBN 0-07-100406-8.
5) Edwards, L. dan Endean, M. (1990). Manufacturing with materials, Butterworth Heinemann, ISBN 0-7506-2754-9.</td></tr>
</table>

	6) Lange, K. (1985). Handbook of metal forming, R.R Donnelly & Sons Company, ISBN 0-07-036285-8.

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1				√					
CO2						√			
CO3						√			
CO4						√			
CO5								√	

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name:	Conventional Machining Technology
Module level, if applicable:	Graduate
Code:	MES 8206
Sub-heading, if applicable:	-
Classes, if applicable:	-
Semester:	1st
Module coordinator:	Prof. Dr. Ir. Dwi Rahdiyanta, M.Pd.
Lecturer(s):	Prof. Dr. Ir. Dwi Rahdiyanta, M.Pd.
Language:	Indonesian and English
Classification within the curriculum:	Compulsory Courses
Teaching format / class hours per week during the semester:	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload:	90,7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes self-study per week for 16 weeks.
Credit points:	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: analyze basic metal cutting concepts and parameters in conventional machining processes (PLO 3) CO2: plan the setting of the fixture/accessories/chuck tools on conventional machines in the production process with conventional machining (PLO 3). CO3: create work steps in conventional machining processes (lathe, milling, drill and grinding) (PLO 5) CO4: create ideas for making machine components or products using conventional machines (PLO 5) CO5: solve problems with valid scientific arguments in the manufacture of products using conventional machine tools (PLO 8)

<table>
<tr><td>Content</td><td>Conventional Machining Technology course weighs 2 credits. This course aims to equip students in mastering the concepts, theories and applications of conventional machining techniques in the manufacturing industry. The materials include: (1) The concept of machining techniques including the basic theory of cutting metal in several kinds of machine tools (lathe, milling, drill and grinding); (2) Machining theory including mastery of the theory of determining cutting conditions and machining process elements (V, f, a); and (3) Applications including the preparation of work steps and SOP in the production process using conventional machine tools.</td></tr>
<tr><td>Study/exam achievement</td><td>Learning evaluation is carried out by quizzes, individual assignments, midterm exams, and final semester exams. The quiz is a multiple choice test at the end of the meeting. The assignment includes making work preparation (WP) in the product manufacturing process using lathe, milling, drill, and grinding. Working on questions is for midterm and final semester exams.
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="5">Quiz = 15%
Individual assignment= 25%
Mid exam = 25%
Final exam = 35%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignment</td><td>Written test</td></tr>
<tr><td>5</td><td>CO5</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>Job Sheet, Turning Machine, Milling Machine, Drilling Machine, and Grinding Machine.</td></tr>
</table>

Literature	1) Education Department Victoria, (1976). Fitting and Machining, Volume 1. Victoria: Wilke and Company Limited. 2) Education Department Victoria, (1976). Fitting and Machining, Volume 2. Victoria: Wilke and Company Limited. 3) Education Department Victoria, (1976). Fitting and Machining, Volume 3. Victoria: Wilke and Company Limited. 4) Gerling, H. (1985). All about Machine Tools. New Delhi: Wiley Eastern Limited. 5) Chapman, W.A.J. (1981). Senior Workshop Calculation. London: Edward Arnold Ltd. 6) Rochim, T. (1993). Proses Permesinan. Bandung: Bina Cipta. 7) Dept of the Army. (1996). Fundamentals of Machine Tools Training Circulat 9-524. Washington DC: Headquarters Dept of the Army US. 8) Wit Grzesik. (2016). Advanced Machining Processes of Metallic Materials: Theory, Modelling and Applications. New York: Elsevier. 9) Schneider, G. J. (2015). Cutting Tool Application. Detroit: Prentice Hall. 10) Jain, V. K. (2013). Fundamentals of Machining Processes: Conventional and Nonconventional Processes. Kanpur India: CRC Press. 11) Gupta, H. N. (2009). Manufacturing Processes. New Delhi: New Age International Limited. 12) Hoffman, E. G. (1996). Jig and Fixture Design. Washington: Delmar Publisher.

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1			√						
CO2			√						
CO3					√				
CO4					√				
CO5								√	

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MODULE HANDBOOK

Module name	Computer Aided Design and Drafting (CADD)
Module level, if applicable	Graduate
Code	MES 8207
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	2nd
Module coordinator	Dr. Apri Nuryanto, M.T.
Lecturer(s)	Dr. Apri Nuryanto, M.T.
Language	Indonesian and English
Classification within the curriculum	Compulsory specific courses
Teaching format / class hours per week during the semester	100 minutes lectures, 120 minutes Blended Learning (Face to face and e- Learning), 120 minutes structured activities.
Workload	90.7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: master the theoretical concepts and applications of basic science of mechanical engineering science. (PLO4) CO2: apply the field of expertise in mechanical engineering vocational education and utilize science, technology, and/or art in the field of mechanical engineering education in solving problems and adapt practical and theoretical learning situations in vocational high schools (*SMK*) or vocational training institutions. (PLO4), (PLO5) CO3: identify and understand the coordinate system in CAD, create geometric shapes from drawing entities, select and arrange image representations, modify image entities, understand ways of projecting engineering drawings, create view drawings,

	manage sizing and annotations on working drawings, understand ways of providing tolerance, handle customization and surface configuration, create working drawings according to ISO standards with CAD, create 3D models, create working drawings according to ISO standards from 3D models, assemble model from 3D components, present 3D models, and make working drawings according to ISO standards of 3D components. (PLO4), (PLO5), (PLO8) CO4: create 3D models that are suitable for manufacturing and meet mechanical engineering design rules, plan, model, and apply CAD for plate work, identify various types of joint machines, choose the appropriate type of connection, design and analyze machine frames, models, designs and engine elements including shafts, pins and bearings, identify power successors using gears, chains and belts, design and model power successors, models, designs and springs, demonstrate kinematic performance of machines, analyze the dynamics of various types of machines, demonstrate how to assemble a machine, plan machine components by making a list of requirements, and have knowledge of the latest developments in CAD applications for manufacturing. (PLO4), (PLO5), (PLO8)
Content	The course consists of CAD 2D and 3D. The CAD 2D course provides students to have the competence to produce computer-assisted machine drawings. The content of the course includes coordinate systems in CAD, creating geometric shapes, image representations, modifying image entities, displaying images with projections, creating view drawings, providing image sizes and annotations, indicating tolerances, customizing and configuring surfaces, drafting and creating working drawings according to ISO standards, basic level 3D modeling concepts and creation of working drawings directly from 3D models, advanced 3D modeling and design, designing a component and placing work features, assembling components, and 3D drawing presentation. Then, for CAD 3D, the course facilitates students to have the ability to model, design, and perform technical analysis of machine elements and structures based on CAD software and 3-dimensional (3D) models. The content of this course includes modeling, designing and analysis of plate work, machine frames, joints (bolts and welding), engine elements for power transmission (shafts, pegs, bearings, gears), and springs. Students are expected to be able to analyze the movement or how the machine works and present the assembly process and or the decomposition of the components of an assembly. Students will also be introduced to the concepts of CAD / CAM and rapid prototyping (3D Printing).

<table>
<tr><td>Study/exam achievements</td><td>The final mark will be weight as follow:
<table>
<tr><th>No.</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>Presence, Performance, and Quiz</td><td>Written Data, Discussion, Written Test</td><td>10%</td></tr>
<tr><td>2</td><td>CO2</td><td>Individual Assignment</td><td>Written Test, Discussion, Presentation</td><td>30%</td></tr>
<tr><td>3</td><td>CO3</td><td>Group Assignment</td><td>Written Test, Discussion, Presentation</td><td>35%</td></tr>
<tr><td>4</td><td>CO4</td><td>Final Exam</td><td>Written Test</td><td>25%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>Board, LCD Projector, Laptop/Computer, Video conference, LMS e-learning besmart.uny.ac.id,</td></tr>
<tr><td>Literature</td><td>

1) Autodesk AutoCAD Offline Help. Accessed from within the software Autodesk AutoCAD 2016.
2) Autodesk Inventor Offline Help. Accessed from within the software Autodesk Inventor Professional 2016.
3) Ngadiyono, Y., Ristadi, Febrianto A., 2013, Menggambar Teknik Bersama Inventor 2012, 1st Edition, Publisher Deepublish, Yogyakarta.
4) Tremblay, T., 2012, Autodesk Inventor 2013 and Autodesk Inventor LT 2013 Essentials, John Wiley & Sons Inc., Indianapolis.
5) Yarwood, A. 2008, Introduction to AutoCAD 2009: 2D and 3D Design, 1st Edition, Newness, Burlington.
6) Autodesk Inventor Engineer’s Handbook. Accessed from within the software Autodesk Inventor Professional 2017.
7) Budynas, Richard G., Nisbet, J. Keith., 2011, Shigley’s Mechanical Engineering Design, 9th Edition, McGraw Hill, New York.
8) Gere, James. N., 2006, Mechanics of Materials, Thomson, Ontario.
9) Hamrock, Bernard J., Schmid, Steven R., Jacobson, Bo O., 2005, Fundamentals of Machine Elements, 2nd Edition, McGraw Hill, New York.
10) Niemann, Gustav., 1999, Elemen Mesin Jilid 1,2 dan 3, Penerbit Erlangga, Jakarta.
11) Shigley, Joseph E., 1977, Mechanical Engineering Design, 3rd Edition, McGraw Hill, Tokyo.
12) Ugural, Ansel C., 2004, Mechanical Design an Integrated Approach, 1st edition, MCGraw Hill, Singapore.

</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1				√					
CO2				√	√				
CO3				√	√			√	
CO4				√	√			√	

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Technology CNC Machining and CAM
Module level, if applicable	Graduate
Code	MES8208
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	2nd Semester
Module coordinator	Dr. Bernardus Sentot Wijanarka, M.T
Lecturer(s)	Dr. Bernardus Sentot Wijanarka, M.T
Language	Indonesian and English
Classification within the Curriculum	Compulsory Specific Courses
Teaching format / class hours per week during the semester	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload	90,7 hours per semester, consist of: 100 minutes lectures, 120 minutes structured activities, and 120 minutes self-study per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1 : analyze the theoretical concepts and applications of CNC machining technology. (PLO3) CO2 : compose CNC programs manually by using MDI / Manual Data Input in the CNC machine control system for lathes and milling machines. (PLO3) CO3 : planning settings of fixture / accessories / chuck tools in CNC machines. (PLO5) CO4 : create work drawings for the process of manufacturing workpiece on a CNC machine using CAM software. (PLO5) CO5 : create ideas for making machine components (PLO8) CO6 : solve the problem of making products with valid scientific arguments using CAM software (PLO8)

<table>
<tr><td>Content</td><td>The CNC and CAM Machining Technology course weighs 2 credits. This course aims to equip students to master the theoretical concepts and application theories of CNC and CAM machining technologies used in the manufacturing industry. The materials of this course include: CNC machine setup, CNC machine operation, and Fanuc and ISO version of CNC machine programming. CNC machine programming uses programming of manual data input using a CNC machine simulator and programming with CAM using Mastercam software. The practical activities in this course include: preparation of job sheets. Practices are carried out using computers and CNC machines in the laboratories of CNC FT UNY.
.</td></tr>
<tr><td>Study/exam achievement</td><td>Learning evaluation is carried out by: quizzes, individual assignments, midterm exams, and final semester exams. The quizzes are in the form of multiple-choice test and at the end of the meeting. Assignments include making CNC programs for lathes and milling machines, working on questions in midterm exams and final semester exams.
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="5">Quiz = 20%
Individual assignment= 30%
Mid exam = 20%
Final exam = 30%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignment</td><td>Written test</td></tr>
<tr><td>5</td><td>CO5</td><td>● Quiz
● Individual assignment</td><td>Written test</td></tr>
</table></td></tr>
</table>

			• Mid exam • Final exam		
	6	CO6	• Quiz • Individual assignment • Mid exam • Final exam	Written test	
Form of Media	Job Sheet, Computer software (CAM), Simulator software (SSCNC), Turning CNC Machine, Milling CNC Machine				
Literature	1) Cincinnati. (2001). Fanuc ISO Programming. GE Fanuc: Korea. 2) Daewoo. (1998). *CNC Program Manual*. Daewoo Heavy Industries and Machinery LTD: Korea. 3) Fanuc. (2006). *FANUC Series- Model C_ FANUC Series O1 Mate-Model C- Maintenance Manual- B-64115EN/02*. Yamanashi Japan. 4) Fanuc. (2008). *FANUC Series- oi Model D/ Fanuc Series o1 Mate-Model D- Start Up Manual*. Yamanashi Japan. 5) Fanuc. (2008). *FANUC Series- Model Oi-Model/ Oi Mate-Model D-Parameter Manual*. Yamanashi Japan. 6) Fanuc. (2008). *FANUC Series- Model Oi-Model/ Oi Mate-Model D-For For Lathe System User's Manual*. Yamanashi Japan. 7) Fanuc. (2004). *Fanuc Series oi-MC Operators Manual*. Yamanashi Japan. 8) MTS. (2005). *CNC Exercises for The Fanuc Programming Key*. MTS Mathematisch Technische Software-Entwicklung GmbH Kaiserin-Augusta-Allee 101 D-10553: Berlin. 9) Nanjing Swansoft. (2006). *Swan NC Simulation Software Fanuc System Instraction of Operation and Programming.* Nanjing Swan Software Technology Co.,Ltd. : Nanjing. 10) Swansoft. (2007). *Swan NC Simulation Software*. Nanjing: Swan Software Technology Co.Ltd. 11) Wijanarka,B.S. (2014). Pemrograman Mesin CNC untuk mesin bubut dan frais dengan sistem kontrol Fanuc OiMate. UNY Press: Yogyakarta. 12) Wijanarka,B.S dan Arifin,A.(2017). CADCAM Frais dan Bubut untuk Mesin Frais dan Bubut Menggunakan MasterCam X. UNY Press: Yogyakarta.				

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1			√						
CO2			√						
CO3					√				
CO4					√				
CO5								√	
CO6								√	

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Production Automation
Module-level, if applicable	Graduate
Code	MES 8209
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	1st Semester
Module coordinator	Dr. Eng. Ir. Didik Nurhadiyanto, S.T., M.T.
Lecturer(s)	Dr. Eng. Ir. Didik Nurhadiyanto, S.T., M.T.
Language	Bahasa Indonesia and English
Classification within the Curriculum	Compulsory Specific courses
Teaching format/class hours per week during the semester	100 minutes of lectures, 120 minutes of structured learning assignments, 120 minutes of independent learning assignments per week
Workload	90,7 hours per semester consisting of 100 minutes of lectures, 120 minutes of structured learning assignments, and 120 minutes of independent learning assignments per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have the ability to: CO1: analyze the theoretical concept and application of automation in the field of mechanical engineering (PLO3) CO2: analyze the theoretical concept and application of automation in the field of metal fabrication (PLO4) CO3: analyze the theoretical concept and application of automation in the field of welding technology (PLO6) CO4: create the ideas of automation design in the field of mechanical engineering vocation (PLO8)
Content	The Automation Production Course weighs 2 credits. This course aims to equip the students to master the theoretical concepts and automation application theories used in the manufacturing industry. The materials include manufacturing systems, automation in manufacturing systems, industrial control systems, sensors, actuators, and digital-analog conversions; numerical control of manufacturing system; PLC and ladder diagrams; logic

<table>
<tr><td></td><td>gates, material transport, storage systems, and flexible manufacturing system.</td></tr>
<tr><td>Study/exam achievement</td><td>Learning evaluations are conducted by giving quizzes, individual assignments, midterm exams, and final semester exams. The quizzes are conducted at the end of the meeting in the form of an essay test, assignment, presentation, midterm and final semester exams.
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="3">Quiz = 20%
Individual assignment= 30%
Mid exam = 20%
Final exam = 30%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td><td></td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>PPT presentation and LCD projector</td></tr>
<tr><td>Literature</td><td>1) Groover, M. P., Automation, Production System, and Computer-Aided Manufacturing. Fourth Edition, New Jersey, Prentice Hall Inc, 2015.
2) Budiyanto, M dan Wijaya, A., Pengenalan Dasar-dasar PLC (Programmable Logic Controller) Disertai Contoh Aplikasinya, Penerbit Gava Media, Yogyakarta, Cetakan Kedua, 2006</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1			√						
CO2				√					
CO3						√			
CO4								√	

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name:	Occupational Health and Safety
Module level,if applicable:	Graduate
Code:	MES 8210
Sub-heading,if applicable:	-
Classes,if applicable:	-
Semester:	2nd Semester
Module coordinator:	Dr. Ir. Mujiyono, M.T.
Lecturer(s):	Dr. Ir. Mujiyono, M.T.
Language:	Indonesian and English
Classification within the curriculum:	Elective courses
Teaching format / class hours per week during the semester:	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload:	90,7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Creditpoints:	2
Prerequisites course(s):	-
Course Outcomes	After taking this course the students have ability to: CO1: internalize value, norm, and academic ethic (PLO1) CO2: show responsibility and independency of given task (PLO1) CO3: determine health, safety, and work health factors when doing machine work (PLO3) CO4: determine safety, security, and work health factors when doing fabrication work (PLO4)
Content:	The goal of Occupational Health and Safety (OSH) subject is to give knowledge to students related to the implementation of OSH in workshop or laboratory. Occupational Health and Safety refers to any activity that guarantees and protects safety and workforce health through the attempt of preventing work accident and occupational illness (Government Regulation 50 Year 2012). The purpose of OSH is to maintain health and

<table>
<tr><td></td><td>safety of working environment. It protects co-workers, relatives, consumers, and other parties</td></tr>
<tr><td>Study/exam echievement:</td><td>Learning evaluation is conducted by giving quizzes, individual assignments, presentations, mid semester exams, and final exams. Quizzes are conducted at the end of semester in a form of multiple choice assignments. The assessment includes teaching material constructions (pdf and ppt)
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Wage</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="4">Quiz = 20%
Individual assignment= 30%
Mid exam = 20%
Final exam = 30%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
</table></td></tr>
<tr><td>Form of Media:</td><td>PPT Presentation, E-learning besmart.uny.ac.id, digital resources from websites</td></tr>
<tr><td>Literature:</td><td>1) Suma’mur. (1989). Keselamatan Kerja dan Pencegahan Kecelakaan. Jakarta : CV Haji Masagung.
2) Rudi Suardi. (2005). Sistem Manajemen Keselamatan dan Kesehatan Kerja. Jakarta : penerbit PPM
3) Achadi Budi Cahyono. (2004). Keselamatan Kerja Bahan Kimia di Industri. Yogyakarta : Gadjah Mada University Press.</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1	√								
CO2	√								
CO3			√						
CO4				√					

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MASTER OF EDUCATION
IN MECHANICAL ENGINEERING

MODULE HANDBOOK

Module name	Industrial Metrology and Quality Control
Module level,if applicable	Graduate
Code	MES 8211
Sub-heading,if applicable	-
Classes,if applicable	-
Semester	2nd Semester
Module coordinator	Dr. Bernardus Sentot Wijanarka, M.T
Lecturer(s)	Dr. Bernardus Sentot Wijanarka, M.T
Language	Indonesian and English
Classification within the Curriculum	Elective courses
Teaching format / class hours per week during the semester	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload	90,7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: analyze theoretical concept of manufactured product measurement as a product of machine process (PLO3) CO2: analyze theoretic concept of manufactured product measurement as a product of metal fabrication process (PLO4) CO3: analyze theoretic concept of manufactured product measurement as a product of metal welding process (PLO6) CO4: develop plan of geometric measurement and quality control for manufactured product as a product of machine process (PLO5) CO5: develop plan of geometric measurement and quality

<table>
<tr><td></td><td>control for manufactured product as a product of fabrication metal (PLO5)
CO6 : develop plan of geometric measurement and quality control for manufactured product as a product of metal welding process (PLO5)</td></tr>
<tr><td>Content</td><td>This subject discusses about the basic concepts of linear measurement manufactured product which include; product geometric quality concept and the principles of linear measurement. To recognize and understand standard tolerance and position: recognize the principles and use many kinds of good linear measurement tools for mechanics, electronic, optic and other kinds. To measure manufactured products such as measure many kinds of gears, outer and inner thread, konis and slop for outside, radius, surface roughness, and other complex shapes. To do calibration of linear measurement tools, to treat the measurement tools, to organize the measurement tools. To recognize and understand the quality control principle of manufactured product.</td></tr>
<tr><td>Study/exam achievement</td><td>Learning evaluation is conducted by giving quizzes, individual assignments, presentations, mid and final exams. Quiz is conducted at the end of semester in a form of multiple choices assignment. The assessment includes teaching materials development (pdf and PPT).
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="4">Quiz = 20%
Individual assignment= 30%
Mid exam = 20%
Final exam = 30%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignme
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual</td><td>Written test</td></tr>
</table></td></tr>
</table>

			assignment		
	5	CO5	• Quiz • Individual assignment • Mid exam • Final exam	Written test	
	6	CO6	• Quiz • Individual assignme • Mid exam • Final exam	Written test	
Form of Media	PPT presentation, E-learning besmart.uny.ac.id, digital resources from websites				
Literature	1) Howarth, P, dan Redgrave, F. 2008. Metrology in Short 3rd Edition. Euramet: Denmark 2) Raghavendar, N.V., and Krishnamurty, L. 2013. Engineering Metrology and Measurements. Oxford University Press: England. 3) Wahyudin P. Syam.2018. Metrologi Manufaktur: Pengukuran dan analisa dimensi dan geometri. 4) ASME B89.7.2 1999 Dimensional measurement planning American Society of Mechanical Engineering. 5) ASME Y14.5 2009 Dimensioning and tolerancing American Society of Mechanical Engineering. 6) ASME Y14.5-1 1994 Mathematical definition of dimensioning and tolerancing principles American Society of Mechanical Engineering. 7) ISO 14405-1 2016 Geometrical product specification (GPS) – Dimensional tolerancing – Part 1: Linear sizes: International Organization for Standardization. 8) ISO 14405-2 2011 Geometrical product specification (GPS) – Dimensional tolerancing – Part 2: Dimensions other than linear sizes: International Organization for Standardization. 9) ISO 14405-3 2016 Geometrical product specification (GPS) – Dimensional tolerancing – Part 3: Angular sizes :International Organization for Standardization.				

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1			√						
CO2				√					

CO3						√			
CO4					√				
CO5					√				
CO6					√				

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Mechanics of Materials
Module level, if applicable	Graduate
Code	MES 8212
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	1st Semester
Module coordinator	Dr. Ir. Sutopo, M.T.
Lecturer(s)	Dr. Ir. Sutopo, M.T.
Language:	Bahasa and English
Classification within the curriculum	Elective course
Teaching Design	100 minutes for lectures, 120 minutes for Blended Learning (Face to face and E-Learning), 120 minutes for structured activities.
Workload	90.7 hours per semester consisting of 100 minutes for lectures, 120 minutes for structured activities, and 180 minutes for independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	At the end of the course, the students are expected to be able to: CO1: master the concepts of material stress and strain, axial stress and strain, torque, bending moment, shear stress as well as loading design and analysis. (PLO4) CO2: Solve engineering and technology problems and design systems, processes, and components by utilizing other fields of science. (PLO5), (PLO6) CO3: Formulate new ideas from research findings to carry out technology development.

<table>
<tr><td>Content</td><td>The course is an elective course which weighs 2 theoretical credits. This course provides a learning experience for master level students related to the behavior of solid objects due to stress and strain. It studies various methods of calculating stress and pressure on structural elements, such as beams, columns, and shafts. The results of the calculations are used to predict the response of the structure due to the load and its susceptibility to various failure modes which consider the properties of the material such as yield strength, maximum strength, Young's modulus, and Poisson's ratio. (PLO5), (PLO6)</td></tr>
<tr><td>Course Weight</td><td>The course weight will be divided as follows:
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td rowspan="4">1
2
3</td><td rowspan="4">CO1
CO2
CO3</td><td>a. Presence</td><td>Written Data</td><td>10%</td></tr>
<tr><td>b. Assignment, Quiz, Performance</td><td>Written Test, Discussion, Presentation</td><td>45%</td></tr>
<tr><td>c. Mid-term Exam</td><td>Written Test</td><td>20%</td></tr>
<tr><td>d. Final Exam</td><td>Written Test</td><td>25%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Media</td><td>Board, LCD Projector, Laptop/Computer, Video conference, LMS E-Learning besmart.uny.ac.id</td></tr>
<tr><td>Literature</td><td>1) Ferdinand Beer ... [et al.]. (2012). Mechanics of materials, 6th Edition.
2) Barry J. Goodno and James M. Gere. (2018). Mechanics of Materials, 9th Edition.
3) Ferdinand P. Beer ... [et al.]. (2011). Statics and mechanics of materials, 1st Edition.</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1				√					
CO2					√	√			
CO3					√	√			

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Machine Maintenance and Repair
Module level, if applicable	Graduate
Code	MES8213
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	2nd
Module coordinator	Prof. Thomas Sukardi, M.Pd.
Lecturer(s)	Prof. Thomas Sukardi, M.Pd.
Language	Indonesian and English
Classification within the Curriculum	Elective courses
Teaching format/class hours per week during the semester	100 minutes lectures, 120 minutes structured learning assignments, 120 minutes independent learning assignments per week
Workload	90,7 hours per semester consisting of 100 minutes lectures, 120 minutes structured learning assignments, and 120 minutes independent learning assignments per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1 : analyze theoretical concepts and application of machine maintenance and repair in the field of machining technology (PLO3) CO2 : analyze theoretical concepts and application of machine maintenance and repair in the field of metal fabrication (PLO4) CO3 : analyze theoretical concepts of machine maintenance and repair in the field of welding technology (PLO6) CO4 : analyze application concepts of machine maintenance and repair in the field of welding technology (PLO6)
Content	This course discusses knowledge related to (1) machine maintenance and repair management which includes: spare parts, personnel, maintenance, maintenance plans, maintenance administration; (2) maintenance organization which includes the organization for the maintenance of facilities and maintenance of

<table>
<tr><td></td><td>infrastructure; (3) understanding the concepts of maintenance of engine parts/components, engine component units, and work system maintenance of a machine, and (4) understanding the concept of Total Productive maintenance (TPM). The learning method uses problem-based learning in terms of analyzing maintenance management, maintenance application, and evaluating the results of maintenance process.</td></tr>
<tr><td>Study/exam achievement:</td><td>Learning evaluation is carried out through quizzes, individual assignments, midterm exam, and final semester exam. Quizzes are in the form of essay tests at the end of the meeting, and assignments, presentations, and midterm and final semester exams.
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment Mid exam
● Final exam</td><td>Written test</td><td rowspan="4">Quiz = 20%
Individual assignment = 30%
Mid exam = 20%
Final exam = 30%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td><td></td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>PPT presentation and LCD projector</td></tr>
</table>

Literature	1) Anton L. Wartawan, *Pelumas Otomotif dan industri*, Jakarta, Balai Pustaka, 1998. **2)** Supandi, *Manajemen perawatan industri*, Bandung, Ganeca Exact, 1990. 3) Soeprapto Rachmad dan Tim PPM, *Perawtan dan Perbaikan Mesin. Diktat Perkuliahan PPM*, Yogyakarta, FT UNY, 2015.

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1			√						
CO2				√					
CO3						√			
CO4						√			

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MASTER OF EDUCATION
IN MECHANICAL ENGINEERING

MODULE HANDBOOK

Module name	Production System
Module level, if applicable	Graduate
Code	MES8214
Sub-heading,if applicable	-
Classes,if applicable	-
Semester	2nd Semester
Module coordinator	Dr. Eng. Ir. Didik Nurhadiyanto, S.T., M.T.
Lecturer(s)	Dr. Eng. Ir. Didik Nurhadiyanto, S.T., M.T.
Language	Indonesian and English
Classification within the curriculum	Elective courses
Teaching format /class hours per week during the semester	100 minutes lectures, 120 minutes structured learning assignments, 120 minutes independent learning assignments per week
Workload	90,7 hours per semester consisting of : 100 minutes lectures, 120 minutes structured learning assignments, and 120 minutes independent learning assignments per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: analyze the theoretical concept and application of production system in the field of mechanical technology (PLO3) CO2: analyze the theoretical concept and application of production system in the field of metal fabrication (PLO4) CO3: analyze the theoretical concept and application of production system in the field of vocational mechanical engineering (PLO8) CO4: create system production design in the field of vocational mechanical engineering (PLO8)

<table>
<tr><td>Content</td><td>Production system is a set of operation that manage and process the input in raw material, intermediate product, part component and/or subassembly produce value added product or finished good by using technological element resources (machine, instrument, product facility and energy) and organization element (labor, management, information and modal). Production system includes design, procure, produce, store, deliver, and service.</td></tr>
<tr><td>Study/exam achievement</td><td>Learning evaluation is conducted through individual assessment, quiz, midterm and final semester test, essay, assignment, and presentation.
<table>
<tr><th>No</th><th>CO</th><th>Assesment Object</th><th>Assesment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Quiz
● Individual assignment</td><td>Written test</td><td rowspan="4">Quiz = 20%
Individual assignment = 30%
Mid exam = 20%
Final exam = 30%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Quiz
● Individual assignment
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>3</td><td>CO3</td><td>● Quiz
● Individual assignme
● Mid exam
● Final exam</td><td>Written test</td></tr>
<tr><td>4</td><td>CO4</td><td>● Quiz
● Individual assignme
● Mid exam
● Final exam</td><td>Written test</td></tr>
</table></td></tr>
<tr><td>Media</td><td>PPT presentation and LCD projector</td></tr>
<tr><td>References</td><td>1) Groover, M. P., Automation, Production System, and Computer Aided Manufacturing. Fourd Edition, New Jersey, Prentice Hall Inc, 2015.
2) Budiyanto, M dan Wijaya, A., Pengenalan Dasar-dasar PLC (Programmable Logic Controller) Disertai Contoh Aplikasinya, Penerbit Gava Media, Yogyakarta, Cetakan Kedua, 2006
3) Nahmias, Steven, Production and Operations Analysis, Mc Graw Hill International Edition, 2001.</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1			√						
CO2				√					
CO3								√	
CO4								√	

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MASTER OF EDUCATION
IN MECHANICAL ENGINEERING

MODULE HANDBOOK

Module name	Technical Analysis Method
Module level, if applicable	Graduate
Code	MES 8215
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	
Module coordinator	Dr. Ir. Mujiyono, S.T., M.T., W.Eng. IPM
Lecturer(s)	Dr. Ir. Mujiyono, S.T., M.T., W.Eng. IPM
Language:	Bahasa and English
Classification within the curriculum:	Elective course
Teaching format / class hours per week during the semester:	100 minutes lectures, 120 minutes Blended Learning (Face to face and e Learning), 120 minutes structured activities.
Workload	90.67 hours per semester consisting of 150 minutes lectures, 180 minutes structured activities, and 180 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	-
Course Outcomes	After taking this course the students have ability to: CO1: apply knowledge of mathematics, science, mechanical engineering, and other relevant knowledge with full initiative to identify, formulate and solve mechanical engineering problems. CO2: design and conduct experiments and analyze and interpret data. CO3: utilize modern engineering methods, skills, and tools which are necessary for mechanical engineering work.

<table>
<tr><td>Content:</td><td>The course will introduce basic mathematics subjects such as linear algebra, probability and statistics, and differential equation. As a complement, the teaching process will incorporate the application of high-level language computing software. In order to prepare for advanced studies, the module will also introduce the use of symbolic processing in solving mathematical problems. The class will utilize problem-based learning with numerous independent exercises. Therefore, class participants will build their knowledge and skill as the course progresses.</td></tr>
<tr><td>Study/exam achievements</td><td>The final mark will be conducted as follows:
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td rowspan="6">1</td><td rowspan="6">CO 1
CO 2
CO 3</td><td>a. Presence</td><td>Written Data</td><td>5%</td></tr>
<tr><td>b. Individual Assignment</td><td>Written Test</td><td>10%</td></tr>
<tr><td>c. Group Assignment and Performance</td><td>Written Test, Discussion, Presentation</td><td>20%</td></tr>
<tr><td>d. Quiz</td><td></td><td>10%</td></tr>
<tr><td>e. Mid-term Exam</td><td></td><td>25%</td></tr>
<tr><td>f. Final Exam</td><td></td><td>30%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Media</td><td>Board, LCD Projector, Laptop/Computer, Video conference, LMS (E-learning: besmart.uny.ac.id)</td></tr>
<tr><td>Literature</td><td>1) Thomas, G. B., Weir, M. D., and Hass, J. (2010). Thomas' Calculus 12th Edition. Boston: Pearson Education, Inc.
2) Kreyszig, E. (2006). Advanced Engineering Mathematics 9th Edition. Hoboken: John Wiley & Sons, Inc.
3) O'Neil, P. V. (2012). Advanced Engineering Mathematics 7th Edition. Stamford: Cengage Learning
4) Varberg, D., Purcell, E., and Rigdon, S. (2006). Calculus 9th Edition. New York: Prentice Hall.
5) Peebles, P. Z. (2001). Probability, Random, Variables, and Random Signal Principles 4th Edition. New York: McGraw-Hill.
6) Bendat, J. S. and Piersol, A. G. (2000). Random Data: Analysis and Measurement Procedures 3rd Edition. Hoboken: John Wiley & Sons, Inc.</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1					√				
CO2					√			√	
CO3					√			√	

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Scientific Paper Writing
Module level, if applicable	Graduate
Code	MES8217
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	3rd Semester
Module coordinator	Dr. Bernardus Sentot Wijanarka, M.T
Lecturer(s)	Dr. Bernardus Sentot Wijanarka, M.T
Language	Indonesian and English
Classification within the Curriculum	Compulsory Specific Courses
Teaching format / class hours per week during the semester	100 minutes lectures, Blended Learning (Face to face and e Learning) 120 minutes, 120 minutes structured activities per week
Workload	90,7 hours per semester consisting of 100 minutes lectures, 120 minutes structured activities, and 120 minutes independent learning per week for 16 weeks.
Credit points	2
Prerequisites course(s)	
Course Outcomes	After taking this course the students have ability to: CO1 : work independently and be responsible in preparing scientific papers. (PLO 1) CO2: create scientific ideas and arguments in the preparation of scientific papers in the field of mechanical engineering vocational. (PLO 8) CO3: write papers for Scopus indexed international conferences. (PLO 9) CO4 : create scientific papers in the form of Sinta 2 accredited national journals or Scopus indexed international journals. (PLO 9)
Content	This course weighs 2 credits. This course provides students with provisions to write articles in accredited national journals or reputable international journals. The content of the course includes introduction, methods, research results, conclusions, and references.

<table>
<tr><td>Study/exam achievement</td><td>Learning evaluation is carried out by independent assignments and journal portfolios compiled by students.
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Individual assignment</td><td>Oral presentation</td><td rowspan="4">Individual assignment= 50%
Document assessment: 50%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Individual assignment
●</td><td>Oral presentation and document assessment</td></tr>
<tr><td>3</td><td>CO3</td><td>● Individual assignment</td><td>Oral presentation and document assessment</td></tr>
<tr><td>4</td><td>CO4</td><td>● Individual assignment</td><td>Publication</td></tr>
</table></td></tr>
<tr><td>Form of Media</td><td>LCD Projector, E-learning, Video Conference</td></tr>
<tr><td>Literature</td><td>1) PPs UNY.(2017). Panduan Penulisan dan Penilaian Tesis dan Disertasi. PPs UNY: Yogyakarta (PPs UNY.(2017). Guide to Writing and Assessing Thesis and Dissertation. PPs UNY: Yogyakarta)
2) PPS UNY.(2019). Buku Panduan Publikasi Mahasiswa Pascasarjana UNY. PPs UNY: Yogyakarta (PPS UNY.(2019). UNY Postgraduate Student Publication Handbook. . PPs UNY: Yogyakarta)
3) Additional references (10 - 30 paper): Journals which are suitable for mechanical engineering education and in accordance with the title of each PPS UNY students' thesis. UNY.(2017). Guide to Writing and Assessing Thesis and Dissertation. PPs UNY: Yogyakarta</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1	√								
CO2								√	
CO3									√
CO4									√

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MASTER OF EDUCATION
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MODULE HANDBOOK

Module name	Thesis Proposal
Module level, if applicable	Graduate
Code	MES8316
Sub-heading, if applicable	-
Classes, if applicable	-
Semester	3rd Semester
Module coordinator	Dr. Bernardus Sentot Wijanarka, M.T
Lecturer(s)	Dr. Bernardus Sentot Wijanarka, M.T
Language(s)	Indonesian and English
Classification within the Curriculum	Compulsory Specific Courses
Teaching Design	150 minutes for lectures, 180 minutes for blended learning (Face to face and E-Learning) and 180 minutes for structured activities per week
Workload	136 hours per semester consisting of 150 minutes for lectures, 180 minutes for structured activities, and 180 minutes for independent learning per week for 16 weeks.
Credit	3
Prerequisites course(s)	-
Course Outcomes	At the end of the course, the students are expected to be able to: CO1: internalize norms, values, and academic ethics (PLO1) CO2: master the procedure of writing thesis proposal based on the guideline for writing PPs UNY thesis and dissertation (PLO7) CO3: write thesis proposal based on the guideline of scientific studies. (PLO8) CO4: write scientific studies for national seminar or international seminars (PLO8)
Content	This course includes two parts, namely: writing a thesis proposal and a seminar proposal with a weight of 3 credits consisting of 2 credits of theory and 1 credit of practice. This subject discusses the procedures for writing a thesis proposal following the guidelines for writing a thesis and dissertation of the PPs UNY Program. The course content includes determining the title, identifying the background of the problem, elaborating literature reviews, indicating relevant research, designing research

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<tr><td></td><td>methods, developing instruments, validating instruments, and making draft papers for international conferences/international journals. At the beginning and the middle of the lecture, students present the results of CHAPTER I, II, and III. Furthermore, the students are expected to be able to present their thesis proposal in classroom seminar and national or international seminar.</td></tr>
<tr><td>Course Weight</td><td>The course weight will be divided as follows:
<table>
<tr><th>No</th><th>CO</th><th>Object of Assessment</th><th>Technique of Assessment</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1</td><td>● Individual assignment</td><td></td><td rowspan="4">Individual assignment = 50%

Portfolio = 50%</td></tr>
<tr><td>2</td><td>CO2</td><td>● Individual assignment</td><td>Oral presentation</td></tr>
<tr><td>3</td><td>CO3</td><td>● Individual assignment</td><td>Oral presentation and Portfolio</td></tr>
<tr><td>4</td><td>CO4</td><td>● Individual assignment</td><td>Oral presentation and Portfolio</td></tr>
</table></td></tr>
<tr><td>Media</td><td>Video conference, LMS E-learning besmart.uny.ac.id</td></tr>
<tr><td>Literature</td><td>1) PPs UNY.(2017). Panduan Penulisan dan Penilaian Tesis dan Disertasi. PPs UNY: Yogyakarta
2) PPS UNY.(2019). Buku Panduan Publikasi Mahasiswa Pascasarjana UNY. PPs UNY: Yogyakarta
3) Additional references (10-30 papers): Journal of Mechanical Engineering and articles related to students' thesis project</td></tr>
</table>

PLO and CO mapping

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CO1	√								
CO2	√								
CO3							√	√	
CO4							√	√	