Module Handbook

Human-Machine Interaction

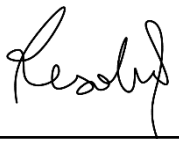
Bachelor Degree Program
Department of Biomedical Engineering

Faculty of Intelligent Electrical Technology and Informatics
Institut Teknologi Sepuluh Nopember

Numerical Methods Portfolio - 1

MODULE HANDBOOK
Human-Machine Interaction
DEPARTMENT OF BIOMEDICAL ENGINEERING
INSTITUT TEKNOLOGI SEPULUH NOPEMBER
Number : 6856/IT2.IX.5.1.2/B/PP.03.00.00/2023

ENDORSEMENT PAGE

Proses ***Process***	**Penanggung Jawab** ***Person in Charge***			**Tanggal** ***Date***
	Nama ***Name***	**Jabatan** ***Position***	**Tandatangan** ***Signature***	
Perumus *Preparation*	Eko Agus Suprayitno, S.Si, M.T.	Dosen *Lecturer*		**November 18, 2022**
Pemeriksa dan Pengendalian *Review and Control*	Dr. Tri Arief Sardjono, S.T., M.T.	Tim kurikulum *Curriculum team*		**November 20, 2022**
Persetujuan *Approval*	Ir. Josaphat Pramudijanto, M.Eng.	Koordinator RMK *Course Cluster Coordinator*		**April 13, 2023**
Penetapan *Determination*	Dr. Achmad Arifin, S.T., M.Eng.	Kepala Departemen *Head of Department*		**April 17, 2023**

MODULE HANDBOOK

HUMAN-MACHINE INTERACTION

Module name	**Human-Machine Interaction**	
Module level	Undergraduate	
Code	EB234503	
Course (if applicable)	Human-Machine Interaction	
Semester	Fifth Semester (Odd)	
Person responsible for the module	Rezki El Arif, S.T., M.T., Ph.D	
Lecturer	Muhammad Yazid, B.Eng., M.Eng. Rezki El Arif, S.T., M.T., Ph.D Muhammad Adib Syamlan, S.T., M.T.	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergradute degree program, **mandatory**, 5th semester	
Type of teaching, contact hours	Lectures, <60 students	
Workload	1. Lectures : 3 x 50 = 150 minutes per week. 2. Exercises and Assignments : 3 x 50 = 150 minutes per week. 3. Private learning : 3 x 50 = 150 minutes per week.	
Credit points	3 credit points (sks)	
Requirements according to the examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.	
Mandatory prerequisites	-	
Learning outcomes and their corresponding PLOs	Course Learning Outcome (CLO) after completing this module, CLO 1: Students are able to explain the principles of human and machine interaction. CLO 2: Students are able to design a user-friendly interface system. CLO 3: Students explain natural interface techniques. CLO 4: Students are able to develop a new natural interface.	 PLO-05 PLO-10 PLO-02 PLO-08
Content	Describes the principle of interaction between humans and machines and the manufacture of a good machine interface system, as well as natural interface techniques using biopotentials.	
Study and examination requirements and forms of examination	● Written Assignment ● Presentation ● Project	

	● Mid-term examination ● Final examination
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.
Reading list	Main: 1. A.J. Dix, J.E. Finlay, G.D. Abowd and R. Beale, *Human-Computer Interaction, Third Edition.* Prentice Hall, USA, 2003. 2. Deborah J. Mayhew, *Principles and Guidelines in Software User Interface Design.* Prentice Hall, USA, 1992. 3. Schneiderman, Ben, *Designing The User Interface: Strategic for Effective Human – Computer Interaction, 2nd edition.* Addison-Wesley, 1992. 4. P. Insap Santosa, *Interaksi Manusia dan Komputer; Teori dan Praktek.* Andi Yogyakarta, 1997.

I. Rencana Pembelajaran Semester / *Semester Learning Plan*

	INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS) **FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS** **DEPARTEMEN TEKNIK BIOMEDIK**	**Kode Dokumen**

RENCANA PEMBELAJARAN SEMESTER

MATA KULIAH (MK) ***COURSE***	**KODE** ***CODE***	**Rumpun MK** ***Course Cluster***	**BOBOT (sks)** **Credits**		**SEMESTER**	**Tgl Penyusunan** ***Compilation Date***
Human-Machine Interaction ***Human-Machine Interaction***	EB234503	Ilmu Dasar Teknik *Basic Engineering*	T=3	P=0	V	Nov 9, 2022

OTORISASI / PENGESAHAN ***AUTHORIZATION / ENDORSEMENT***	**Dosen Pengembang RPS** ***Developer Lecturer of Semester Learning Plan***	**Koordinator RMK** ***Course Cluster Coordinator***	**Ka DEPARTEMEN** ***Head of Department***
	(Rezki El Arif, S.T., M.T., Ph.D)	**(Dr. Rachmad Setiawan, S.T., M.T.)**	**(Dr. Achmad Arifin, S.T., M.Eng.)**

Capaian Pembelajaran ***Learning Outcomes***	**CPL-PRODI yang dibebankan pada MK** ***PLO Program Charged to The Course***	
	CPL-02 ***PLO-02***	Mampu **menerapkan** ilmu pengetahuan, keterampilan, dan metode terkini dalam menyelesaikan permasalahan di bidang Teknik Biomedika. *Able to apply the latest knowledge, skills and methods in solving problems in the field of Biomedical Engineering.*
	CPL-05 ***PLO-05***	Mampu **menemukan**, **memahami**, **menjelaskan**, **merumuskan**, dan **menyelesaikan** permasalahan umum pada bidang Teknik dan permasalahan khusus pada bidang Teknik Biomedika yang meliputi instrumentasi biomedika cerdas, teknik rehabilitasi medika, pencitraan dan pengolahan citra medika, serta informatika medika *Able to **find**, **understand**, **explain**, **formulate**, and **solve** general problems in the field of Engineering and special problems in the field of Biomedical Engineering which includes intelligent biomedical instrumentation, medical rehabilitation techniques, imaging and processing of medical images, and medical informatics*

	CPL-08 ***PLO-08***	Mampu **mendesain** komponen, sistem, dan proses dalam bidang Teknik Biomedika yang sistematis, logis, dan realistis sesuai dengan spesifikasi yang ditentukan dengan mempertimbangkan aspek keselamatan, sosial, budaya, lingkungan, dan ekonomi dengan **mengenali/memanfaatkan** sumber daya lokal dan nasional dengan wawasan global *Able to **design** components, systems, and processes in the field of Biomedical Engineering that are systematic, logical, and realistic appropriate with specified specifications by considering aspects of safety, social, cultural, environmental, and economic by **recognizing / utilizing** local and national resources with global insight*
	CPL-10 **PLO-10**	Mampu **bekerja dalam tim** lintas disiplin dan budaya serta **bertanggung jawab** kepada masyarakat dan **mematuhi hukum dan etika profesi** dalam menyelesaikan masalah Teknik Biomedika. Able to work in interdisciplinary and intercultural teams and be responsible to the community and comply with legal and professional ethics in solving Biomedical Engineering problems.
	Capaian Pembelajaran Mata Kuliah (CPMK) – Bila CP MK sebagai kemampuan pada tiap tahap pembelajaran CP MK = Sub CP MK ***Course Learning Outcome (CLO) - If CLO as description capability of each Learning Stage in the course, then CLO = LLO***	
	CP MK 1 ***CLO 1***	Mahasiswa mampu menjelaskan prinsip-prinsip interaksi manusia dan mesin. *Students are able to explain the principles of human and machine interaction.*
	CP MK 2 ***CLO 2***	Mahasiswa mampu merancang sistem antar muka yang user-friendly. *Students are able to design a user-friendly interface system.*
	CP MK 3 ***CLO 3***	Mahasiswa manjelaskan teknik-teknik natural interface. *Students explain natural interface techniques.*
	CP MK 4 ***CLO 4***	Mahasiswa mampu mengembangkan natural interface yang baru. *Students are able to develop a new natural interface.*

Peta CPL – CP MK

Map of PLO - CLO

	CPL-01	CPL-02	CPL-03	CPL-04	CPL-05	CPL-06	CPL-07	CPL-08	CPL-09	CPL-10	CPL-11	CPL-12
CPMK 1 / SUB CPMK 1 *CLO 1 / LLO 1*					√							
CPMK 2 / SUB CPMK 2 *CLO 2 / LLO 2*										√		

	CPMK 3 / SUB CPMK 3 *CLO 3 / LLO 3*		√										
	CPMK 4 / SUB CPMK 4 *CLO 4 / LLO 4*								√				

Diskripsi Singkat MK ***Short Description of Course***	Mata kuliah Human-Machine Interaction merupakan mata kuliah wajib yang menjelaskan tentang prinsip interaksi antara manusia dengan mesin dan pembuatan sistem antarmuka mesin yang baik, serta teknik teknik natural interface menggunakan biopotensial. *The Human-Machine Interaction course is a compulsory course that explains the principles of interaction between humans and machines and the manufacture of a good machine interface system, as well as natural interface techniques using biopotential.*
Bahan Kajian: Materi pembelajaran ***Course Materials:***	1. Konsep interaksi manusia mesin dan pengenalan user interface / *The concept of human-machine interaction and introduction to the user interface* 2. Teknik-teknik natural interface / *natural interface techniques* 3. Perancangan antarmuka grafik/ *Graphical interface design* 4. Penyajian data berbasis aplikasi mobile/ *Mobile application-based data presentation* 5. Penyajian data berbasis aplikasi web / *Web application-based data presentation* 6. Antarmuka dengan biopotensial/ *Biopotential interfaces* 7. Antarmuka otak dan komputer / *Brain computer interface* 8. Algoritma pengenalan suara/ *Speech recognition algorithm*
Pustaka ***References***	**Utama / *Main*:** 1. A.J. Dix, J.E. Finlay, G.D. Abowd and R. Beale, *Human-Computer Interaction, Third Edition.* Prentice Hall, USA, 2003. 2. Deborah J. Mayhew, *Principles and Guidelines in Software User Interface Design.* Prentice Hall, USA, 1992. 3. Schneiderman, Ben, *Designing The User Interface: Strategic for Effective Human – Computer Interaction, 2nd edition.* Addison-Wesley, 1992. 4. P. Insap Santosa, *Interaksi Manusia dan Komputer; Teori dan Praktek.* Andi Yogyakarta, 1997.
Dosen Pengampu ***Lecturers***	Muhammad Yazid, B.Eng., M.Eng. Rezki El Arif, S.T., M.T., Ph.D Muhammad Adib Syamlan, S.T., M.T.
Matakuliah syarat ***Prerequisite***	-

Mg Ke/ *Week*	Kemampuan akhir tiap tahapan belajar (Sub-CPMK) / *Final ability of each learning stage (LLO)*	Penilaian / *Assessment*		Bantuk Pembelajaran; Metode Pembelajaran; Penugasan Mahasiswa; [Estimasi Waktu] / *Form of Learning; Learning Method; Student Assignment; [Estimated Time]*		Materi Pembelajaran [Pustaka] / *Learning Material [Reference]*	Bobot Penilaian /*Assess-ment Load* (%)
		Indikator / *Indicator*	Kriteria & Teknik/ *Criteria & Techniques*				
(1)	(2)	(3)	(4)	Tatap Muka / *In-class* (5)	Daring / *Online* (6)	(7)	(8)
1 - 2	Mahasiswa mampu menjelaskan prinsip-prinsip interaksi manusia dan mesin. *Students are able to explain the principles of human and machine interaction.*	• Ketepatan waktu pengumpulan tugas. • Kebenaran melaksanakan tugas. • Keberhasilan menjelaskan tugas. • Kebenaran jawaban dan analisis. • Kelengkapan dan kerapian hasil laporan presentasi. • Ketepatan menjelaskan pemahaman materi. • *Accuracy of submitting assignments.* • *Correctness of assignment work.* • *Successness in explaining assignments.*	**Non-Tes** **Tugas 1:** • Presentasi ***Non-Test*** ***Task 1:*** • *Presentation*	• Kuliah, diskusi dan tugas. [TM : 2 x (3 x 50")] [BM : 2 x (3 x 50")] [PT : 2 x (3 x 50")] • *Lectures discussion and assignment.* *[FF : 2 x (3 x 50")]* *[SS : 2 x (3 x 50")]* *[SA : 2 x (3 x 50")]*	• Chatting dan diskusi dalam forum platform ITS. • *Chat and discussion in ITS platform forum*	• Konsep interaksi manusia mesin • pengenalan user interface • *The concept of human-machine interaction* • *user interface introduction*	**Tugas 1 /** ***Task 1:*** **1.5**

		● *Correct answer and analysis.* ● *Completeness and neatness of the results of the presentation report.* ● *Accuracy in explaining understanding of the material.*					
3 - 4	Mahasiswa mampu merancang sistem antar muka yang user-friendly. *Students are able to design a user-friendly interface system.*	● Ketepatan waktu pengumpulan tugas. ● Kebenaran melaksanakan tugas. ● Keberhasilan menjelaskan tugas. ● Kebenaran jawaban dan analisis. ● *Accuracy of submitting assignments.* ● *Correctness of assignment work.* ● *Successness in explaining assignments.* ● *Correct answer and analysis.*	**Non-tes :** **Tugas 2:** ● Tugas Tertulis **Proyek 1** ***Non-test:*** ***Task 2:*** ● *Written Task* ***Project 1*** .	● Kuliah, diskusi dan tugas. [TM : 5 x (3 x 50")] [BM : 5 x (3 x 50")] [PT : 5 x (3 x 50")] ● *Lectures discussion and assignment.* *[FF : 5 x (3 x 50")]* *[SS : 5 x (3 x 50")]* *[SA : 5 x (3 x 50")]*	● Chatting dan diskusi dalam forum platform ITS ● *Chat and discussion in ITS platform forum*	● Perancangan antarmuka grafik berbasis WIMP ● Penyajian data berbasis aplikasi mobile ● *WIMP-based graphic interface design.* ● *Mobile application-based data presentation.*	**Tugas 2 /** ***Task 2:*** **2.5** **Proyek 1 /** ***Project 1*****:** **20**
5-7	Mahasiswa mampu memahami dan menjelaskan	● Ketepatan waktu pengumpulan tugas.	**Non tes:** **Tugas 3:** ● Tugas Tertulis	● Kuliah, diskusi dan tugas.	● Chatting dan diskusi dalam	● Teknik-teknik natural interface berbasis visual,	**Tugas 3 /** ***Task 3*****:** **3.5**

	teknik-teknik natural interface. *Students are able to understand and explain natural interface techniques.*	● Kebenaran melaksanakan tugas. ● Keberhasilan menjelaskan tugas. ● Kebenaran jawaban dan analisis. ● Kelengkapan dan kerapian hasil laporan presentasi. ● Ketepatan menjelaskan pemahaman materi. ● *Accuracy of submitting assignments.* ● *Correctness of assignment work.* ● *Successness in explaining assignments.* ● *Correct answer and analysis.* ● *Completeness and neatness of the results of the presentation report.* ● *Accuracy in explaining understanding of the material.*	● Presentasi ***Non-test:*** ***Task 3:*** ● *Written Task* ● *Presentation*	[TM : 3 x (3 x 50")] [BM : 3 x (3 x 50")] [PT : 3 x (3 x 50")] ● *Lectures discussion and assignment.* *[FF : 3 x (3 x 50")]* *[SS : 3 x (3 x 50")]* *[SA :3 x (3 x 50")]*	forum platform ITS ● *Chat and discussion in ITS platform forum*	audio, gerakan, dan bio-potensial. ● *Natural interface techniques based on visuals, audio, motion, and bio-potential.*	**Presetasi / Presentation : 10**
8	**EVALUASI TENGAH SEMESTER**						**15**

	MID-SEMESTER EXAM						
9-10		●		●	●	● Antarmuka dengan biopotensial/ *Biopotential interfaces* ● Penggunaan EOG, EEG, bio-impedance, EMG sebagai interface pada mesin. ● *Use of EOG, EEG, bio-impedance, EMG as interfaces on machines.*	
11-12		●		●	●	● Antarmuka otak dan komputer / *Brain computer interface* ● Algoritma pengenalan suara/ *Speech recognition algorithm*	
13-14	Mahasiswa mampu mengembangkan natural interface yang baru. *Students are able to develop new natural interfaces.*	● Ketepatan waktu pengumpulan tugas. ● Kebenaran melaksanakan tugas. ● Keberhasilan menjelaskan tugas.	**Non-tes :** **Tugas 4:** ● Tugas Tertulis. **Proyek 2**	● Kuliah, diskusi dan tugas. [TM : 3 x (3 x 50")] [BM : 3 x (3 x 50")]	● Chatting dan diskusi dalam forum platform ITS	●	**Tugas 4 / Task 4 : 5** **Proyek 2/ Project 2 : 20**

		● Kebenaran jawaban dan analisis. ● Kelengkapan dan kerapian hasil laporan. ● Ketepatan waktu pengumpulan laporan praktikum. ● Kebenaran menjelaskan proyek praktikum ● *Accuracy of submitting assignments.* ● *Correctness of assignment work.* ● *Successness in explaining assignments.* ● *Correct answer and analysis.* ● *Completeness and neatness of the results of the presentation report.* ● *Accuracy of submitting practicum reports.*	***Non-test:*** ***Task 4:*** ● *Written Task.* ***Project 2***	[PT : 3 x (3 x 50")] ● *Lectures discussion and assignment.* *[FF : 3 x (3 x 50")]* *[SS : 3 x (3 x 50")]* *[SA :3 x (3 x 50")]*	● *Chat and discussion in ITS platform forum*		

		• Correctness of explaining practicum project.					
15-16	**EVALUASI AKHIR SEMESTER** ***FINAL-SEMESTER EXAM***						**15**

TM=Tatap Muka, **PT**=Penugasan Terstuktur, **BM**=Belajar MandirI.
***FF** = Face to Face, **SA** = Structured Assignment, **SS** = Self Study.*

II. Rencana Asesmen & Evaluasi (RAE)/ *Assessment & Evaluation Plan*

	ASSESSMENT & EVALUATION PLAN BACHELOR DEGREE PROGRAM OF BIOMEDICAL ENGINEERING - FTEIC ITS **Course : Human-Machine Interaction**		**RA&E** Write Doc Code
Kode/*code*: **EB234503**	**Bobot sks/*credits* (T/P): 3/0**	**Rumpun MK: Ilmu Dasar Teknik** ***Course Cluster: Basic Engineering***	Smt: VIII
OTORISASI ***AUTHORIZATION***	**Penyusun RA & E** ***Compiler A&EP*** **Rezki El Arif, S.T., M.T., Ph.D**	**Koordinator RMK** ***Course Cluster Coordinator*** **Dr. Rachmad Setiawan, S.T., M.T.**	**Ka DEP** ***Head of DEP*** **Dr. Norma Hermawan, S.T., M.T., M.Sc.**

Mg ke/ *Week* (1)	**Sub CP-MK / *Lesson Learning Outcomes (LLO)* (2)**	**Bentuk Asesmen (Penilaian) *Form of Assessment* (3)**	**Bobot / *Load* (%) (4)**
1-2	**Sub CP-MK 1:** Mahasiswa mampu menjelaskan prinsip-prinsip interaksi manusia dan mesin. ***LLO 1:*** *Students are able to explain the principles of human and machine interaction.*	**Non-tes:** **Tugas 1** Presentasi. **Proyek 1** **Tes:** 1 Soal Pada ETS ***Non-Test*** ***Task 1:*** *Presentation.* ***Project*** ***Test:*** *1 Question in Mid Exam*	Tugas 1 / *Task 1:* 5 Proyek 1 / *Project 1 :* 5
3-7	**Sub CP-MK 2:** Mahasiswa mampu merancang sistem antar muka yang user-friendly. ***LLO 2:*** *Students are able to design a*	**Non-tes :** **Tugas 1:** Presentasi. **Proyek 1** **Tes :** 1 Soal Pada ETS	Tugas 1 / *Task 1:* 5 Proyek 1 / *Project 1 :* 5

	user-friendly interface system.	***Non-test:*** ***Task 1:*** *Presentation.* ***Project*** ***Test:*** ● *1 Question in Mid Exam*	
8	**Evaluasi Tengah Semester** ***Mid Exam***	**Tes:** Ujian Tulis/Ujian Daring ***Test:*** *Writing Exams / Online Exams*	30
9-11	**Sub CP-MK 3:** Mahasiswa mampu memahami dan menjelaskan teknik-teknik natural interface. ***LLO 3:*** *Students are able to understand and explain natural interface techniques.*	**Non tes:** **Tugas 2:** Tugas Tertulis. **Proyek 2** **Tes :** 1 Soal Pada EAS ***Non-test:*** ***Task 2:*** *Written Task.* *Proyek* ***Test:*** *1 Question in Final Exam*	Tugas 2 / *Task 2* : 5 Proyek 2 / Project 2 : 5
12-14	**Sub CP-MK 4:** Mahasiswa mampu mengembangkan natural interface yang baru. . ***LLO 4:*** *Students are able to develop new natural interfaces.*	**Non tes:** **Tugas 2:** Tugas Tertulis. **Proyek 2** **Tes :** 1 Soal Pada EAS ***Non-test:*** ***Task 2:*** *Written Task.* *Proyek* ***Test:*** *1 Question in Final Exam*	Tugas 2 / *Task 2* : 5 Proyek 2 / Project 2 y: 5

15-16	**Evaluasi Akhir** ***Final Exam***	**Tes:** Ujian Tulis/Ujian Daring ***Test:*** *Writing Exams / Online Exams*	30
		Total bobot penilaian ***Total assessment load***	**100%**

Indikator Pencapaian CPL Pada MK / *Indicator of PLO achievement charged to the course*

CPL yang dibebankan pada MK / *PLO charged to the course*	CPMK / *Course Learning Outcome (CLO)*	Minggu ke / *Week*	Bentuk Asesmen / *Form of Assessment*	Bobot / *Load* (%)
CPL-02 / PLO-02	CPMK 3 / *CLO 3*	*Week- 9-11*	*Written Assignment 1*	5
		Weel- 12-14	*Project Assignment 2*	5
		Week- 15-16	*1 Final Exam Question*	15
CPL-05 / *PLO-05*	CPMK 1 / *CLO 1*	*Week- 3-7*	*Presentation Assignment 1*	5
		Week- 3-7	*Project Assignment 1*	5
		Week- 8	*1 Mid Exam Question*	15
CPL-08 / *PLO-08*	CPMK 4 / *CLO 4*	*Week- 9-11*	*Written Assignment 1*	5
		Weel- 12-14	*Project Assignment 2*	5
		Week- 15-16	*1 Final Exam Question*	15
CPL-10 / PLO-10	CPMK 2 / *CLO 2*	*Week- 3-7*	*Presentation Assignment 1*	5
		Week- 3-7	*Project Assignment 1*	5
		Week- 8	*1 Mid Exam Question*	15
				∑ = 100%

No	*Form of Assessment*	*PLO-01*	*PLO-02*	*PLO-03*	*PLO-04*	*PLO-05*	*PLO-06*	*PLO-07*	*PLO-08*	*PLO-09*	*PLO-10*	*PLO-11*	*PLO-12*	*Total*
1	Tugas 1 (1 Tugas Presentasi) *Task 1*					0.05					0.05			**0.1**

	(1 Presentation Assignment)													
2	Tugas 2 (1 Tugas Tertulis) *Task 2* *(1 Written Assignment)*		0.05						0.05					**0.1**
3	Proyek (2 Tugas Proyek) *Project* *(2 Project Assignment)*		0.05			0.05			0.05		0.05			**0.2**
4	Evaluasi Tengah Semester *Mid Term Exam*					0.15					0.15			**0.3**
5	Evaluasi Akhir Semester *Final Term Exam*		0.15						0.15					**0.3**
	Total		0.25			0.25			0.25		0.25			**1**