



MODULE HANDBOOK BASIC PROGRAMMING



**BACHELOR DEGREE PROGRAM
DEPARTMENT OF BIOMEDICAL ENGINEERING
FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS
TECHNOLOGY**

INSTITUT TEKNOLOGI SEPULUH NOPEMBER


MODULE HANDBOOK

BASIC PROGRAMMING

Module name	Basic Programming	
Module level	Undergraduate	
Code	EC234101	
Course (if applicable)	Basic Programming	
Semester	First Semester (Gasal)	
Person responsible for the module	Nada Fitriyatul Hikmah, S.T., M.T.	
Lecturer	Nada Fitriyatul Hikmah, S.T., M.T.	
Language	Bahasa Indonesia and English	
Relation to curriculum	Undergraduate degree program, mandatory , 1 st semester.	
Type of teaching, contact hours	Lectures, <60 students	
Workload	1. Lectures : 3 x 50 = 100 minutes per week. 2. Exercises and Assignments : 3 x 60 = 180 minutes per week. 3. Private learning : 3 x 60 = 180 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 understand the work concept of a computer system. CLO 2: Students understand the concept of numbers. CLO 3: Students understand the concept of expressions, operands, logical operators, arithmetic operators. CLO 4: Students understand the concept of algorithms. CLO 5: Students are able to convert algorithms. CLO 6: Students are able to solve certain problems using the C programming language. CLO 7: Students are able to make functions.	PLO-02 PLO-02 PLO-02 PLO-02 PLO-06 PLO-08 PLO-06

	CLO 8: Students understand the concept of structure / records and their storage in files.	PLO-02
Content	This course studies learn basic knowledge of programming, algorithm concepts, structured programming, sequences, repetition, selection, functions, data types, structure and file concepts.	
Study and examination requirements and forms of examination	<ul style="list-style-type: none"> ● In-class exercises ● Assignment 1, 2, 3 ● Mid-term examination ● Final examination 	
Media employed	LCD, whiteboard, websites (myITS Classroom), zoom.	
Reading list	Main : <ol style="list-style-type: none"> 1. Discovering Computers: Fundamentals, Fifth Edition (Shelly Cashman Series) by Gary B. Shelly and Misty E. Vermaat 2. Fundamentals of Computer Algorithms by Ellis and Sartaj Sahni Horowitz 3. Introduction to Algorithms, Second Edition by Thomas H. Cormen Programming in ANSI C by Stephen G. Kochan 	

I. Rencana Pembelajaran Semester / Semester Learning Plan

		INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS) FACULTY OF INTELLIGENT ELECTRICAL AND INFORMATICS TECHNOLOGY DEPARTMENT OF BIOMEDICAL ENGINEERING				Document Code
SEMESTER LEARNING PLAN						
MATA KULIAH (MK) COURSE	KODE CODE	Rumpun MK Course Cluster	BOBOT (sks) Credits		SEMESTER	Tgl Penyusunan Compilation Date
Basic Proramming Basic Programming	EC234101	Ilmu Dasar Teknik <i>Basic Engineering</i>	T=3	P=0	I	Oct 31, 2023
OTORISASI / PENGESAHAN AUTHORIZATION / ENDORSEMENT	Dosen Pengembang RPS <i>Developer Lecturer of Semester Learning Plan</i>		Koordinator RMK <i>Course Cluster Coordinator</i>		Ka DEPARTEMEN <i>Head of Department</i>	
	(Nada Fitrieyatul Hikmah, S.T, M.T)		(Dr. Norma Hermawan, S.T., M.Sc.)		(Dr. Achmad Arifin, S.T., M.Eng.)	
Capaian Pembelajaran	CPL-PRODI yang dibebankan pada MK PLO Program Charged to The Course					
Learning Outcomes	CPL-02 PLO-02	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. <i>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.</i>				
	CPL-06 PLO-06	Mampu menerapkan ilmu pengetahuan, keterampilan, dan metode terkini dalam menyelesaikan permasalahan di bidang Teknik Biomedika. <i>Able to apply the latest knowledge, skills and methods in solving problems in the field of Biomedical Engineering</i>				
	CLP-08 CPL-08	Mampu bekerja dalam tim lintas disiplin dan budaya serta bertanggung jawab kepada masyarakat dan mematuhi hukum dan etika profesi dalam menyelesaikan masalah Teknik Biomedika				

		<i>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</i>
Capaian Pembelajaran Mata Kuliah (CPMK) 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 memahami konsep kerja suatu sistem komputer. <i>Students understand the work concept of a computer system.</i>	
CP MK 2 CLO 2	Mahasiswa memahami konsep bilangan. <i>Students understand the concept of numbers.</i>	
CP MK 3 CLO 3	Mahasiswa memahami konsep ekspresi, operand, operator logika, operator aritmetika. <i>Students understand the concept of expressions, operands, logical operators, arithmetic operators.</i>	
CP MK 4 CLO 4	Mahasiswa memahami konsep algoritma. <i>Students understand the concept of algorithms.</i>	
CP MK 5 CLO 5	Mahasiswa mampu mengkonversikan Algoritma. <i>Students are able to convert algorithms.</i>	
CP MK 6 CLO 6	Mahasiswa mampu menyelesaikan persoalan tertentu dengan menggunakan bahasa pemrograman C. <i>Students are able to solve certain problems using the C programming language.</i>	
CP MK 7 CLO 7	Mahasiswa mampu membuat fungsi. <i>Students are able to make functions.</i>	
CP MK 8 CLO 8	Mahasiswa memahami konsep struktur/ record dan penyimpanannya dalam file. <i>Students understand the concept of structure / records and their storage in files.</i>	

Peta CPL – CP MK												
<i>Map of PLO - CLO</i>	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 <i>CLO 1 / LLO 1</i>												
CPMK 2 / SUB CPMK 2 <i>CLO 2 / LLO 2</i>												
CPMK 3 / SUB CPMK 3 <i>CLO 3 / LLO 3</i>												
CPMK 4 / SUB CPMK 4 <i>CLO 4 / LLO 4</i>												
CPMK 5 / SUB CPMK 5 <i>CLO 5 / LLO 5</i>												
CPMK 6 / SUB CPMK 6 <i>CLO 6 / LLO 6</i>												
CPMK 7 / SUB CPMK 7 <i>CLO 7 / LLO 7</i>												
CPMK 8 / SUB CPMK 8 <i>CLO 8 / LLO 8</i>												
Diskripsi Singkat MK	Pada mata kuliah ini, mahasiswa akan mempelajari pengetahuan dasar pemrograman , konsep algoritma, pemrograman terstruktur, runtunan, pengulangan, pemilihan, fungsi, tipe data, konsep struktur dan file.											

Short Description of Course	<i>This course studies basic programming, concept of algorithm, structured programming, sequence, looping, selecting, function, data type, structure and file concept.</i>
Bahan Kajian: Materi pembelajaran Course Materials:	<ol style="list-style-type: none"> 1. Sejarah komputer / <i>The history of computer</i> 2. Sistem komputer / <i>Computer system</i> 3. Sistem bilangan / <i>Numerical system</i> 4. Ekspresi, operand dan operator / <i>Expression, operand, and operator</i> 5. Algoritma komputer, runtunan, pengulangan dan pemilihan / <i>computer algorithm, sequence, looping, and selecting</i> 6. Bahasa pemrograman C / <i>C programming language</i> 7. Tipe data dan struktur / <i>Data type and its structure</i> 8. <i>Array</i> 9. Pengurutan data / <i>Data Sorting</i> 10. Barisan dan deret / <i>Sequence and series</i>
Pustaka References	<p>Utama / Main:</p> <ol style="list-style-type: none"> 1. Discovering Computers: Fundamentals, Fifth Edition (Shelly Cashman Series) by Gary B. Shelly and Misty E. Vermaat 2. Fundamentals of Computer Algorithms by Ellis and Sartaj Sahni Horowitz 3. Introduction to Algorithms, Second Edition by Thomas H. Cormen Programming in ANSI C by Stephen G. Kochan <p>Pendukung / Supporting:</p>
Dosen Pengampu Lecturers	Nada Fitrieyatul Hikmah, S.T., M.T.
Matakuliah syarat Prerequisite	-

Mg ke/ Week	Kemampuan akhir tiap tahapan belajar (Sub-CPMK) / <i>Final ability of each learning stage (LLO)</i>	Penilaian / Assessment		Bantuk Pembelajaran; Metode Pembelajaran; Penugasan Mahasiswa; [Estimasi Waktu] / <i>Form of Learning; Learning Method; Student Assignment;</i> [Estimated Time]		Materi Pembelajaran [Pustaka] / <i>Learning Material</i> [Reference]	Bobot Penilaian /Assessment Load (%)
		Indikator / <i>Indicator</i>	Kriteria & Teknik / <i>Criteria & Techniques</i>	Tatap Muka / <i>In-class</i> (5)	Daring / <i>Online</i> (6)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Mahasiswa memahami konsep kerja suatu sistem komputer. <i>Students understand the work concept of a computer system.</i>	<ul style="list-style-type: none"> ● Mampu menjelaskan perkembangan teknologi komputer ● Mampu menjelaskan bagian fungsional suatu komputer yang meliputi Central Processing Unit, Bus, Unit Input dan Output. ● Mampu menjelaskan hubungan antar unit fungsional komputer. ● <i>Able to explain the development of computer technology</i> ● <i>Able to explain the functional parts of a computer which includes the Central Processing Unit, Bus, Input and Output Unit.</i> ● <i>Able to explain the correlation between</i> 	<p>Non-tes : Tugas membuat makalah.</p> <p>Non-test : <i>Assignment of writing paper</i></p>	<ul style="list-style-type: none"> ● Kuliah dan brainstorming, tanya jawab. [TM : 3 x 50"] [BM : 3 x 50"] [PT : 3 x 50"] ● <i>Presentation and brainstorming, ask and answer.</i> [FF : 3 x 50"] [SA : 3 x 50"] [SS : 3 x 50"] 	<ul style="list-style-type: none"> ● Chatting dan diskusi dalam forum platform ITS. ● <i>Chat and discussion in ITS platform forum.</i> 	<ul style="list-style-type: none"> ● Sejarah komputer, sistem komputer, Central Processing Unit, Memory, Control Bus, Unit Input Output. ● <i>Computer history, computer system, Central Processing Unit, Memory, Control Bus, Input Output Unit.</i> 	5

		<i>computer functional units.</i>					
2	<p>Mahasiswa memahami konsep bilangan.</p> <p><i>Students understand the concept of numbers.</i></p>	<ul style="list-style-type: none"> ● Mampu menjelaskan konsep bilangan dan lambang bilangan. ● Mampu menjelaskan konsep sistem bilangan desimal, biner, octal dan hexa desimal. ● Mampu mengkonversikan dari satu sistem bilangan ke sistem bilangan yang lain. ● <i>Able to explain the concept of numbers and number symbols.</i> ● <i>Able to explain the concept of decimal, binary, octal and hexa decimal number systems.</i> 	<p>Non-tes : Tugas mengerjakan soal</p> <p>Non-test : <i>Problem solving</i></p>	<ul style="list-style-type: none"> ● Kuliah, diskusi, tanya jawab, latihan soal, tugas. [TM : 3 x 50"] [BM : 3 x 50"] [PT : 3 x 50"] ● <i>Presentation, discussion, ask and answer, exercise, assignment</i> [FF : 3 x 50"] [SA : 3 x 50"] [SS : 3 x 50"] 		<ul style="list-style-type: none"> ● Lambang bilangan, sistem bilangan, Bilangan desimal, bilangan biner, bilangan octal, hexa desimal, konversi bilangan. ● <i>Symbol of number, number systems, decimal numbers, binary numbers, octal numbers, hexa decimals, number conversions.</i> 	5

		<ul style="list-style-type: none"> • <i>Able to convert from one number system to another number system.</i> 					
3-4	<p>Memahami konsep ekspresi, operand, operator logika, operator aritmetika.</p> <p><i>Students understand the concept of expressions, operands, logical operators, arithmetic operators.</i></p>	<ul style="list-style-type: none"> • Mampu menjelaskan fungsi operan dan operator dalam ekspresi. • Mampu menjelaskan jenis-jenis operan dan operator. • Mampu menggunakan operan dan operator dalam suatu ekspresi. • <i>Able to describe operand and operator functions in expressions.</i> • <i>Able to explain the types of operands and operators.</i> • <i>Able to use operands and operators in an expression.</i> 	<p>Non-tes : Penyelesaian permasalahan</p> <p>Non-test : <i>Problem solving</i></p>	<ul style="list-style-type: none"> • Kuliah dan brainstorming, tanya jawab. [TM : 2x(3 x 50")] [BM : 2x(3 x 50")] [PT : 2x(3 x 50")] • <i>Presentation and brainstorming, ask and answer.</i> [FF : 2x(3 x 50")] [SA : 2x(3 x 50")] [SS : 2x(3 x 50")] 		<ul style="list-style-type: none"> • Ekspresi , operand , operator, operator logika, operator aritmetika. • <i>Expressions, operands, operators, logical operators, arithmetic operators.</i> 	10
5-7	<p>Mahasiswa emahami konsep algoritma.</p> <p><i>Students understand the concept of algorithms.</i></p>	<ul style="list-style-type: none"> • Mampu membuat algoritma dengan menggunakan runtunan, pengulangan dan pemilihan. • Membuat algoritma untuk memecahkan 	<p>Non-tes : Penyelesaian permasalahan</p> <p>Non-test : <i>Problem solving</i></p>	<ul style="list-style-type: none"> • Kuliah dan brainstorming, tanya jawab. [TM : 3x(3 x 50")] [BM : 3x(3 x 50")] 		<ul style="list-style-type: none"> • Algoritma, runtunan, pengulangan, pemilihan. • <i>Algorithm, sequence,</i> 	10

		<p>masalah sederhana dengan menggunakan runtunan, pengulangan dan pemelihan.</p> <ul style="list-style-type: none"> • <i>Able to create algorithms using sequences, repetitions and selections.</i> • <i>Able to create algorithms to solve simple problems using sequences, repetitions and selections.</i> 		<p>[PT : 3x(3 x 50")]</p> <ul style="list-style-type: none"> • <i>Presentation and brainstorming, ask and answer.</i> <p>[FF : 3x(3 x 50")] [SA : 3x(3 x 50")] [SS : 3x(3 x 50")]</p>		<p><i>repetition, selection.</i></p>	
8	EVALUASI TENGAH SEMESTER MID-SEMESTER EXAM						20
9 - 10	<p>Mahasiswa mampu mengkonversikan Algoritma.</p> <p><i>Students are able to convert algorithms.</i></p>	<ul style="list-style-type: none"> • Mampu membuat program dalam bahasa C • Dapat membedakan tipe data dalam bahasa C dan menggunakannya dalam membuat suatu program. • <i>Able to program in C language</i> • <i>Can distinguish data types in C language</i> 	<p>Non-tes : Penyelesaian permasalahan</p> <p>Non-test : <i>Problem solving</i></p>	<ul style="list-style-type: none"> • Kuliah dan brainstorming, tanya jawab. <p>[TM : 2x(3 x 50")] [BM : 2x(3 x 50")] [PT : 2x(3 x 50")]</p> <ul style="list-style-type: none"> • <i>Presentation and brainstorming, ask and answer.</i> 		<ul style="list-style-type: none"> • Pemrograman C. Tipe data, struktur. • <i>C programming, data types, structures.</i> 	10


		<i>and use them in creating a program.</i>		<p>[FF : 2x(3 x 50")]</p> <p>[SA : 2x(3 x 50")]</p> <p>[SS : 2x(3 x 50")]</p>			
11 -12	<p>Mahasiswa mampu menyelesaikan persoalan tertentu dengan menggunakan bahasa pemrograman C.</p> <p><i>Students are able to solve certain problems using the C programming language.</i></p>	<ul style="list-style-type: none"> • Mahasiswa mampu membuat program dalam bahasa C untuk mengurutkan N buah data dengan menggunakan metode bubble sort. • Mahasiswa mampu membuat program untuk menghitung berbagai macam bentuk barisan dengan jumlah suku tertentu. • Mahasiswa mampu menghitung deret sampai sejumlah suku tertentu. • <i>Able to make programs in C language to sort N pieces of data using the bubble sort method.</i> • <i>Able to make programs to count</i> 	<p>Non-tes : Penyelesaian permasalahan</p> <p>Non-test : <i>Problem solving</i></p>	<ul style="list-style-type: none"> • Kuliah dan brainstorming, tanya jawab. [TM : 2x(3 x 50")] [BM : 2x(3 x 50")] [PT : 2x(3 x 50")] • <i>Presentation and brainstorming, ask and answer.</i> [FF : 2x(3 x 50")] [SA : 2x(3 x 50")] [SS : 2x(3 x 50")] 		<ul style="list-style-type: none"> • array 1D, array 2D, pengurutan data, barisan, deret. • <i>1D arrays, 2D arrays, data sort, sequences, series.</i> 	10

		<p><i>various forms of sequences with a certain number of terms.</i></p> <ul style="list-style-type: none"> • <i>Able to calculate the sequence to a certain number of rate.</i> 					
13	<p>Mahasiswa mampu membuat fungsi.</p> <p><i>Students are able to make functions.</i></p>	<ul style="list-style-type: none"> • Mengetahui definisi fungsi, konsep akses ke fungsi dan keuntungannya. • Mampu membuat fungsi dalam bahasa C. • <i>Know the function definition, the concept of access to functions and their benefits.</i> • <i>Able to make functions in C language.</i> 	<p>Non-tes : Penyelesaian permasalahan</p> <p>Non-test : <i>Problem solving</i></p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas. [TM : 3 x 50"] [BM : 3 x 50"] [PT : 3 x 50"] • <i>Presentation, discussion, ask and answer, exercise, assignment</i> [FF : 3 x 50"] [SA : 3 x 50"] [SS : 3 x 50"] 		<ul style="list-style-type: none"> • Definisi fungsi, Deklarasi fungsi, Passing parameter (by value, by reference). • <i>Function definition, Function declaration, Passing parameter (by value, by reference).</i> 	5
14	<p>Mahasiswa memahami konsep struktur/ record dan penyimpanannya dalam file.</p> <p><i>Students understand the concept of structure / records and their storage in files.</i></p>	<ul style="list-style-type: none"> • Mengetahui definisi fungsi, konsep struktur, dan konsep file. • Mampu menyimpan data ke file, dan membaca data dari file. • Mampu membuat struktur, mengakses 	<p>Non-tes : Penyelesaian permasalahan</p> <p>Non-test : <i>Problem solving</i></p>	<ul style="list-style-type: none"> • Kuliah, diskusi, tanya jawab, latihan soal, tugas. [TM : 3 x 50"] [BM : 3 x 50"] [PT : 3 x 50"] • <i>Presentation, discussion, ask</i> 		<ul style="list-style-type: none"> • Struktur (record), Penyimpanan ke file eksternal dan pembacaan file dari file eksternal, Penyimpanan dan pembacaan struktur dari file. 	5

		<p>elemen dari struktur, menyimpan struktur ke file, dan membaca struktur dari file.</p> <ul style="list-style-type: none"> • <i>Know function definition, structure concept, and file concept.</i> • <i>Able to save data to files, and read data from files.</i> • <i>Able to create structures, access elements of a structure, save structures to files, and read structures from files.</i> 		<p><i>and answer, exercise, assignment</i> <i>[FF : 3 x 50"]</i> <i>[SA : 3 x 50"]</i> <i>[SS : 3 x 50"]</i></p>		<ul style="list-style-type: none"> • <i>Structure (record), Storage to external files and reading files from external files, Storage and reading of the structure of files.</i> 	
15-16	EVALUASI AKHIR SEMESTER FINAL-SEMESTER EXAM					20	

TM=Tatap Muka, **PT**=Penugasan Terstruktur, **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 : Basic Programming		RA& E
			Write Doc Code
Kode/code: EC234101	Bobot sks/credits (T/P): 3/0	Rumpun MK: Ilmu Dasar Teknik Course Cluster: <i>Basic Engineering</i>	Smt: I
OTORISASI AUTHORIZATION	Penyusun RA & E <i>Compiler A&EP</i> Nada Fitriyatul H, S.T, M.T	Koordinator RMK <i>Course Cluster Coordinator</i> Dr. Norma Hermawan, S.T., M.Sc.	Ka DEP <i>Head of DEP</i> Dr. Achmad Arifin, S.T., M.Eng.

Mg ke/ Week (1)	Sub CP-MK / Lesson Learning Outcomes (LLO) (2)	Bentuk Asesmen (Penilaian) Form of Assessment (3)	Bobot / Load (%) (4)
1	Sub CP-MK 1: Mahasiswa memahami konsep kerja suatu sistem komputer. LLO 1: <i>Students understand the work concept of a computer system.</i>	Non-tes : Tugas membuat makalah. Non-test : <i>Assignment of writing paper.</i>	5
2	Sub CP-MK 2: Mahasiswa memahami konsep bilangan. LLO 2: <i>Students understand the concept of numbers.</i>	Non-tes : Tugas mengerjakan soal. Non-test : <i>Problem solving</i>	5
3-4	Sub CP-MK 3: Memahami	Non-tes : Penyelesaian permasalahan.	10

	<p>konsep ekspresi, operand, operator logika, operator aritmetika.</p> <p>LLO 3: <i>Students understand the concept of expressions, operands, logical operators, arithmetic operators.</i></p>	<p>Non-test : <i>Problem solving.</i></p>	
5-7	<p>Sub CP-MK 4: Mahasiswa memahami konsep algoritma.</p> <p>LLO45: <i>Students understand the concept of algorithms.</i></p>	<p>Non-tes : Penyelesaian permasalahan.</p> <p>Non-test : <i>Problem solving.</i></p>	10
8	<p>Evaluasi Tengah Semester</p> <p>Mid Exam</p>	<p>Tes: Ujian Tulis/Ujian Daring.</p> <p>Test: <i>Writing Exams / Online Exams.</i></p>	20
9-10	<p>Sub CP-MK 5: Mahasiswa mampu mengkonversikan Algoritma.</p> <p>LLO 5: <i>Students are able to convert algorithms.</i></p>	<p>Non-tes : Penyelesaian permasalahan.</p> <p>Non-test : <i>Problem solving.</i></p>	10
11-12	<p>Sub CP-MK 6: Mahasiswa mampu menyelesaikan persoalan tertentu dengan menggunakan</p>	<p>Non-tes : Penyelesaian permasalahan.</p> <p>Non-test : <i>Problem solving.</i></p>	10

	<p>bahasa pemrograman C.</p> <p>LLO 6: <i>Students are able to solve certain problems using the C programming language.</i></p>		
13	<p>Sub CP-MK 7: Mahasiswa mampu membuat fungsi.</p> <p>LLO 7: <i>Students are able to make functions.</i></p>	<p>Non-tes : Penyelesaian permasalahan.</p> <p>Non-test : <i>Problem solving.</i></p>	5
14	<p>Sub CP-MK 8: Mahasiswa memahami konsep struktur/ record dan penyimpanannya dalam file.</p> <p>LLO 8: <i>Students understand the concept of structure / records and their storage in files.</i></p>	<p>Non-tes : Penyelesaian permasalahan.</p> <p>Non-test : <i>Problem solving.</i></p>	5
16	<p>Evaluasi Akhir</p> <p>Final Exam</p>	<p>Tes: Ujian Tulis/Ujian Daring</p> <p>Test: <i>Writing Exams / Online Exams</i></p>	20
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 1 / CLO 1	Week- 1	Task 1	5
	CPMK 2 / CLO 2	Week- 2	Task 2	5
	CPMK 3/ CLO 3	Week- 3-4	Task 3	10
	CPMK 4 / CLO 4	Week- 5-7	Task 4	10
	CPMK 8 / CLO 8	Week- 14	Task 8	5
		Week-8	Mid Exam	20
CPL-06 / PLO-06	CPMK 5 / CLO 5	Week- 9-10	Task 5	10
	CPMK 7 / CLO 7	Week- 13	Task 7	5
CPL-08/PLO-08	CPMK 6/ CLO 6	Week- 11-12	Task 6	10
		Week-16	Final Exam	20
				$\Sigma = 100\%$

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	Task 1		0.05											0.05
2	Task 2		0.05											0.05
3	Task 3		0.1											0.1
4	Task 4		0.1											0.1
5	Task 5						0.1							0.1
6	Task 6						0.1							0.1
7	Task 7								0.05					0.05
8	Task 8		0.05											0.05
9	Mid Exam		0.12				0.08							0.2
	Final Exam		0.12				0.08							0.2
	Total		0.59				0.36		0.05					1

