



18. Course Specification of Programming Language 1

(Python)

I. Course Identification and General Information:						
1.	Course Title:	Programming Language 1 (Python)				
2.	Course Code & Number:	CCE141				
3.	Credit hours:	C.H				TOTAL
		Th.	Tu.	Pr.	Tr.	
		2	-	2	-	3
4.	Study level/ semester at which this course is offered:	Second Year – First semester				
5.	Pre-requisite (if any):	Computer Skills (UR003)				
6.	Co-requisite (if any):	None.				
7.	Program(s) in which the course is offered:	Electrical Engineering – Computer and Control section				
8.	Language of teaching the course:	English				
9.	Location of teaching the course:	Electrical Engineering Department, Faculty of Engineering				
10.	Prepared By:	Asst. Prof. Dr. Sami AL-Maqtari				
11.	Date of Approval:					

II. Course Description:	
<p>This course is an introductory course aiming to provide students with basic programming concepts as well as problem-solving in computer programming for different applications and issues related to computer engineering & controls. It covers the following subjects: Python variables, basic operators, and blocks, Numeric and string data types, defining list and list slicing, use of tuple data type, Program control flow: conditional blocks using variant if statements and variant loop statements, loop manipulation using continue, & break, reusability concept with functions and organizing projects with modules and packages, String, List and</p>	

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Dictionary Manipulations, File manipulation, Regular Expressions, and Introduction to Object-Oriented Programming (OOP). Throughout computer-based lab works, students will develop problem-solving skills using programming techniques.

III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a1	Define the fundamentals of computer programming using Python language and its basics: keywords, variables and data types, reusability with functions and Object-Oriented Programming (OOP).	A1, A2
a2	Acquire knowledge of programs basic blocks, control statements, functions, modules, packages, and files.	A3, A4
b1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.	B1, B2
b2	Express proficiency in the handling of various data types, strings and functions.	B3, B4
c1	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	C1, C2
c2	Identify the commonly used operations involving file systems and regular expressions.	C3, C4
d1	Develop problem-solving skills and applying them to different engineering problems.	D1, D2
d2	Conduct searches on solutions for engineering problems from engineering and non-engineering domains.	D3, D4

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(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Define the fundamentals of computer programming using Python language and its basics: keywords, variables and data types, reusability with functions and Object-Oriented Programming (OOP).	<ul style="list-style-type: none"> • Active Lectures. • Laboratory Sessions. 	<ul style="list-style-type: none"> • Written Exam (Quizzes. Mid-term & Final) • Lab Assessments.
a2- Acquire knowledge of programs basic blocks, control statements, functions, modules, packages, and files.	<ul style="list-style-type: none"> • Active Lectures. • Laboratory Sessions. 	<ul style="list-style-type: none"> • Written Exam (Quizzes. Mid-term & Final) • Lab Assessments.

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.	<ul style="list-style-type: none"> • Active Lectures. • Homework & Assignments, • Laboratory Sessions. 	<ul style="list-style-type: none"> • Written Exam (Quizzes. Mid-term & Final), • Lab Reports • Lab Assessments.
b2- Express proficiency in the handling of various data types, strings and functions.	<ul style="list-style-type: none"> • Active Lectures. • Homework & Assignments, • Laboratory Sessions. 	<ul style="list-style-type: none"> • Written Exam (Quizzes. Mid-term & Final), • Lab Reports • Lab Assessments.

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(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1- Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	<ul style="list-style-type: none"> • Active Lectures. • Laboratory Sessions. • Homework & Assignments 	<ul style="list-style-type: none"> • Written Exams. • Quizzes. • Lab Assessments
c2- Identify the commonly used operations involving file systems and regular expressions.	<ul style="list-style-type: none"> • Laboratory Sessions, • Use of IT Tools. 	<ul style="list-style-type: none"> • Lab Assessments • Lab Reports

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Develop problem-solving skills and applying them to different engineering problems.	Active Lectures, Laboratory Sessions, Projects..	Lab & Project Reports, Quizzes.
d2- Conduct searches on solutions for engineering problems from engineering and non-engineering domains.	Self-Learning, Laboratory Sessions, Projects, Use of IT Tools.	Lab & Project Reports, Short Reports

IV. Course Content:					
A. Theoretical Aspect					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact hours

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1.	Introduction to programming & Problem-Solving	a1, a2, d1	<ul style="list-style-type: none"> ▪ Introduction to programming concepts. ▪ Types and history of programming languages. ▪ History of Python. ▪ Simple example programs in Python, ▪ Basic Problem-solving Method's steps illustrated with example. 	2	4
2.	Basic components of Python programming language	a1, a2, b1, b2	<ul style="list-style-type: none"> ▪ Identifiers, keywords. ▪ Statements and expressions. ▪ Variables and data types. ▪ Operators, precedence and associativity ▪ Indentation and comments. ▪ Input and output statements. ▪ Type conversions. ▪ The type() function and is operator. ▪ Dynamic and strongly typed language. 	1	2
3.	Control Flow Statements	a1, b1, b2	<ul style="list-style-type: none"> ▪ The if decision control flow statement. ▪ The if...else decision control flow statement. ▪ The if...elif...else decision control statement. ▪ Nested if statement. ▪ The while loop. ▪ The for loop. 	2	4

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			<ul style="list-style-type: none"> ▪ The pass, continue and break statements. 		
4.	Functions	a1, b1, b2, c1, d1	<ul style="list-style-type: none"> ▪ Built-in functions ▪ Commonly used modules ▪ Function definition and calling the function. ▪ The return statement and void function. ▪ Scope and lifetime of variables. ▪ Default parameters ▪ Keyword arguments. ▪ *args and **kwargs. ▪ Command line arguments. 	2	4
5.	Strings	a1, b1, b2, c1, d1	<ul style="list-style-type: none"> ▪ Creating and storing strings. ▪ Basic string operations. ▪ Accessing characters in string by index number. ▪ String slicing and joining. ▪ String methods. ▪ Formatting strings, 	1	2
6.	Lists and Dictionaries	a1, b1, b2, c1, d1	<ul style="list-style-type: none"> ▪ Creating lists. ▪ Basic list operations. ▪ Indexing and slicing in lists. ▪ Built-in functions used on lists. ▪ List methods. ▪ The del statement. ▪ Creating dictionary. ▪ Accessing and modifying key:value pairs in dictionaries. 	1	2

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			<ul style="list-style-type: none"> ▪ Built-in functions used on dictionaries. ▪ Dictionary methods. ▪ The del statement. 		
7.	Tuples and Sets	a2, b1, b2, c1, c2, d1, d2	<ul style="list-style-type: none"> ▪ Creating tuples. ▪ Basic tuple operations ▪ Indexing and slicing in tuples ▪ Built-in functions used on tuples ▪ Relation between tuples and lists ▪ Relation between tuples and dictionaries ▪ Tuple methods ▪ Set methods ▪ Traversing of sets. 	1	2
8.	Files manipulation	a2, b1, b2, c1, d1	<ul style="list-style-type: none"> ▪ Types of files. ▪ Creating and reading text data. ▪ File methods to read and write data. ▪ Reading and writing binary files. ▪ The pickle module. ▪ Reading and writing csv files. ▪ Python os and os.path modules. 	1	2
9.	Regular Expressions	a2, b1, b2, c1, c2, d1	<ul style="list-style-type: none"> ▪ Using Special Characters ▪ Regular Expression Methods ▪ Named Groups in Python Regular Expressions. 	1	2

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			<ul style="list-style-type: none"> Regular Expression with glob Module 		
10.	Object-Oriented Programming (OOP)	a2, b1, b2, c1, d1	<ul style="list-style-type: none"> Classes and Objects. Creating Classes in Python. Creating Objects in Python. The Constructor Method. Classes with Multiple Objects. Class Attributes versus Data Attributes. Encapsulation. Inheritance. The Polymorphism 	2	4
Number of Weeks /and Units Per Semester				14	28

B. Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
1.	Working with Python Environments, Software installation and defining different menus and how to operate on Python.	1	2	a1, a2, d1
2.	Variable, identifiers & I/O using Python	1	2	a1, a2, b2, c1, d1
3.	Flow Control Statements: variants of if Statement, variants of for loop and while loop	2	4	b1, b2, c1, c2, d1
4.	Functions in Python	2	4	b1, b2, c1, c2, d1
5.	Strings, Lists and Dictionaries Manipulations	1	2	a1, a2, b1, b2, c1, c2, d1

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6.	Tuples & Set Manipulations	1	2	a2, b1, b2, c1, d1
7.	File Manipulations	1	2	b1, b2, c1, c2, d1, d2
8.	Regular Expressions Manipulations	1	2	b1, b2, c1, c2, d1, d2
9.	OOP, Classes, Encapsulation, Inheritance and Polymorphism	2	4	a1, a2, b1, b2, c1, c2, d1, d2
10.	Course Project Presentation & Evaluation	1	2	a1, a2, b1, b2, c1, c2, d1, d2
11.	Review	1	2	a1, a2, b1, b2, c1, c2, d1
Number of Weeks /and Units Per Semester		14	28	

V. Teaching strategies of the course:

- Active Lectures,
- Laboratory Sessions,
- Computer-based Sessions,
- Homework & Assignments,
- Projects,
- Use of IT Tools.

VI. Assignments & Reports:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Problem-Solving	a1, a2, d1	3 rd	1
2.	Flow Control Statements	a1, a2, b2, c1, d1	4 th	1
3.	Function	a1, a2, b1, b2, c1, d1	6 th & 7 th	1
4.	File & Regular Expression Manipulations	b1, b2, c1, c2, d1, d2	11 th & 12 th	2

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	Short Reports based on lecturer opinions			
5.	OOP Short Reports based on lecturer opinions	b1, b2, c1, c2, d1, d2	13 th & 14 th	2
6.	Lab Reports	a1, a2, b1, b2, c1, d2	3 rd to 13 th	8
	Total			15

VII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1.	Assignments & Reports	3 rd to 14 th	15	10%	a1, a2, b1, b2, c1, c2, d1, d2
2.	Quizzes	Once per month	10	6.67%	a1, a2, b1, b2, c1, d1,
3.	Mid-Term Exam	8 th	20	13.33%	a1, a2, b1, b2, c1, d1
4.	Final Exam (practical including term Project)	15 th	30	20%	a1, a2, b1, b2, c1, c2, d1, d2
5.	Final Exam (theoretical)	16 th	75	50%	a1, a2, b1, b2, c1, d1
	Total		150	100%	

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VIII. Learning Resources:	
<i>Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).</i>	
1- Required Textbook(s) (maximum two).	
	1- Gowrishankar S, Veena A, 2018, “Introduction to Python Programming”, 1st Edition, CRC Press. ISBN-13: 978-0815394372
2- Essential References.	
	1- Jake VanderPlas, 2016, “Python Data Science Handbook: Essential Tools for Working with Data”, 1st Edition, O'Reilly Media. ISBN-13: 978-1491912058 2- Wesley J Chun, 2015, “Core Python Applications Programming”, 3rd Edition, Pearson Education India. ISBN-13: 978-9332555365
3- Electronic Materials and Web Sites etc.	
	1-

IX. Course] Policies:	
	Class Attendance:
1.	- The students should have more than 75% of attendance according to rules and regulations of the faculty.
	Tardy:
2.	- The students should respect the timing of attending the lectures. They should attend within 15 minutes from starting of the lecture.
	Exam Attendance/Punctuality:
3.	- The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for mid-term exam and final exam.
	Assignments & Projects:
4.	- The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.
	Cheating:
5.	- If any cheating occurred during the examination, the student is not allowed to continue and he has to face the examination committee for enquires.

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6.	<p>Plagiarism:</p> <ul style="list-style-type: none"> - If one student attends the exam on another behalf; he will be dismissed from the faculty according to the policy, rules and regulations of the university.
7.	<p>Other policies:</p> <ul style="list-style-type: none"> - All the teaching materials should be kept out the examination hall and mobile phones are not allowed. - Mutual respect should be maintained between the student and his teacher and also among students. Failing in keeping this respect is subject to the policy, rules and regulations of the university.

Reviewed By	<p><u>Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat</u></p> <p><u>President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi</u></p> <p><u>Name of Reviewer from the Department: Assoc. Prof. Dr. Farouk Al-Fuhaidy</u></p>
	<p><u>Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa</u></p> <p><u>Assoc. Prof. Dr. Ahmed Mujahed</u></p> <p><u>Asst. Prof. Dr. Munasar Alsubri</u></p>

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18. Course Plan of Programing Language 1 (Python)

I. Information about Faculty Member Responsible for the Course:						
Name of Faculty Member	Dr. Sami AL-MAQTARI	Office Hours				
Location & Telephone No.	771010885	SAT	SUN	MON	TUE	WED
E-mail	dr.samiaziz@gmail.com			10-12		

II. Course Identification and General Information:						
1.	Course Title:	Programing Language 1 (Python)				
2.	Course Code & Number:	CCE141				
3.	Credit hours:	C.H				TOTAL
		Th.	Tu.	Pr.	Tr.	
		2	-	2	-	
4.	Study level/ semester at which this course is offered:	2 nd Year – 1 st semester				
5.	Pre-requisite (if any):	Computer Skills (UR003)				
6.	Co-requisite (if any):	None.				
7.	Program(s) in which the course is offered:	Electrical Engineering – Computer and Control section				
8.	Language of teaching the course:	English				
9.	System of Study:	Semesters				
10.	Mode of delivery:	Collective and individual learning				
11.	Location of teaching the course:	Electrical Engineering Department, Faculty of Engineering				

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III. Course Description:

This course is an introductory course **aiming** to provide students with basic programming concepts as well as problem-solving in computer programming for different applications and issues related to computer engineering & controls. It covers the following subjects: Python variables, basic operators, and blocks, Numeric and string data types, defining list and list slicing, use of tuple data type, Program control flow: conditional blocks using variant if statements and variant loop statements, loop manipulation using continue, & break, reusability concept with functions and organizing projects with modules and packages, String, List and Dictionary Manipulations, File manipulation, Regular Expressions, and Introduction to Object-Oriented Programming (OOP). Throughout computer-based lab works, students will develop problem-solving skills using programming techniques.

IV. Intended learning outcomes (ILOs) of the course:

Brief summary of the knowledge or skill the course is intended to develop:

- 1- Define the fundamentals of computer programming using Python language and its basics: keywords, variables and data types, reusability with functions and Object-Oriented Programming (OOP).
- 2- Acquire knowledge of programs basic blocks, control statements, functions, modules, packages, and files.
- 3- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- 4- Express proficiency in the handling of various data types, strings and functions.
- 5- Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
- 6- Identify the commonly used operations involving file systems and regular expressions.
- 7- Develop problem-solving skills and applying them to different engineering problems.
- 8- Conduct searches on solutions for engineering problems from engineering and non-engineering domains.

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V. Course Content:				
Distribution of Semester Weekly Plan of Course Topics/Items and Activities.				
A. Theoretical Aspect:				
Order	Topics List	Sub Topics List	Week Due	Contact Hours
1.	- Introduction to programming & Problem-Solving	<ul style="list-style-type: none"> - Introduction to programming concepts. - Types and history of programming languages. - History of Python. - Simple example programs in Python, - Basic Problem-solving Method's steps illustrated with example. 	1 st , 2 nd	4
2.	- Basic components of Python programming language	<ul style="list-style-type: none"> - Identifiers, keywords. - Statements and expressions. - Variables and data types. - Operators, precedence and associativity - Indentation and comments. - Input and output statements. - Type conversions. - The type() function and is operator. - Dynamic and strongly typed language. 	3 rd	2
3.	- Control Flow Statements	<ul style="list-style-type: none"> - The if decision control flow statement. - The if...else decision control flow statement. - The if...elif...else decision control statement. - Nested if statement. - The while loop. - The for loop. - The pass, continue and break statements. 	4 th , 5 th	4

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4.	- Functions	<ul style="list-style-type: none"> - Built-in functions - Commonly used modules - Function definition and calling the function. - The return statement and void function. - Scope and lifetime of variables. - Default parameters - Keyword arguments. - *args and **kwargs. - Command line arguments. 	6 th , 7 th	4
5.	- Mid Term Exam	- ALL Previous Topics	8 th	2
6.	- Strings	<ul style="list-style-type: none"> - Creating and storing strings. - Basic string operations. - Accessing characters in string by index number. - String slicing and joining. - String methods. - Formatting strings, 	9 th	2
7.	- Lists and Dictionaries	<ul style="list-style-type: none"> - Creating lists. - Basic list operations. - Indexing and slicing in lists. - Built-in functions used on lists. - List methods. - The del statement. - Creating dictionary. - Accessing and modifying key:value pairs in dictionaries. - Built-in functions used on dictionaries. - Dictionary methods. - The del statement. 	10 th	2

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8.	- Tuples and Sets	<ul style="list-style-type: none"> - Creating tuples. - Basic tuple operations - Indexing and slicing in tuples - Built-in functions used on tuples - Relation between tuples and lists - Relation between tuples and dictionaries - Tuple methods - Set methods - Traversing of sets. 	11 th	2
9.	- Files manipulation	<ul style="list-style-type: none"> - Types of files. - Creating and reading text data. - File methods to read and write data. - Reading and writing binary files. - The pickle module. - Reading and writing csv files. - Python os and os.path modules. 	12 th	2
10.	- Regular Expressions	<ul style="list-style-type: none"> - Using Special Characters - Regular Expression Methods - Named Groups in Python Regular Expressions. - Regular Expression with glob Module 	13 th	2
11.	- Object-Oriented Programming (OOP)	<ul style="list-style-type: none"> - Classes and Objects. - Creating Classes in Python. - Creating Objects in Python. - The Constructor Method. - Classes with Multiple Objects. - Class Attributes versus Data Attributes. - Encapsulation. - Inheritance. - The Polymorphism 	14 th , 15 th	4
12.	- Final Exam	- ALL Topics	16 th	2
Number of Weeks/Units Per Semester			16	32

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B. Practical Aspect:			
Order	Topics List	Week Due	Contact Hours
1.	- Working with Python Environments, Software installation and defining different menus and how to operate on Python.	1 st	2
2.	- Variable, identifiers & I/O using Python	2 nd	2
3.	- Flow Control Statements: variants of if Statement, variants of for loop and while loop	3 rd & 4 th	4
4.	- Functions in Python	5 th & 6 th	4
5.	- Strings, Lists and Dictionaries Manipulations	7 th	2
6.	- Tuples & Set Manipulations	8 th	2
7.	- File Manipulations	9 th	2
8.	- Regular Expressions Manipulations	10 th	2
9.	- OOP, Classes, Encapsulation, Inheritance and Polymorphism	11 th , 12 th	4
10.	- Review	13 th	2
11.	- Course Project Presentation & Evaluation	14 th	2
12.	- Final Lab Exam	15 th	2
Number of Weeks/Units Per Semester		15	30

VI. Teaching strategies of the course:
<ul style="list-style-type: none"> • Active Lectures, • Laboratory Sessions, • Computer-based Sessions, • Homework & Assignments, • Projects, • Use of IT Tools.

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VII. Assignments:			
No	Assignments	Week Due	Mark
1.	Problem-Solving	3 rd	1
2.	Flow Control Statements	4 th	1
3.	Function	6 th & 7 th	1
4.	File & Regular Expression Manipulations Short Reports based on lecturer opinions	11 th & 12 th	2
5.	OOP Short Reports based on lecturer opinions	13 th & 14 th	2
6.	Lab Reports	3 rd to 13 th	8
Total			15

VIII. Schedule of Assessment Tasks for Students During the Semester:				
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1.	Assignments & Reports	3 rd to 14 th	15	10%
2.	Quizzes	Once per month	10	6.67%
3.	Mid-Term Exam	8 th	20	13.33%
4.	Final Exam (practical including term Project)	14 th & 15 th	30	20%
5.	Final Exam (theoretical)	16 th	75	50%
Total			150	100%

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IX. Learning Resources:	
Written in the following order: (Author - Year of publication - Title - Edition - Place of publication - Publisher).	
1- Required Textbook(s) (maximum two).	
	1- Gowrishankar S, Veena A, 2018, "Introduction to Python Programming", 1st Edition, CRC Press. ISBN-13: 978-0815394372
2- Essential References.	
	1- Jake VanderPlas, 2016, "Python Data Science Handbook: Essential Tools for Working with Data", 1st Edition, O'Reilly Media. ISBN-13: 978-1491912058 2- Wesley J Chun, 2015, "Core Python Applications Programming", 3rd Edition, Pearson Education India. ISBN-13: 978-9332555365
3- Electronic Materials and Web Sites etc.	
	1-

X. Course Policies:	
Unless otherwise stated, the normal course administration policies and rules of the Faculty of Engineering apply. For the policy, see: -----	
	Class Attendance:
1.	- The students should have more than 75% of attendance according to rules and regulations of the faculty.
	Tardy:
2.	- The students should respect the timing of attending the lectures. They should attend within 15 minutes from starting of the lecture.
	Exam Attendance/Punctuality:
3.	- The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for mid-term exam and final exam.
	Assignments & Projects:
4.	- The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.

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5.	<p>Cheating:</p> <ul style="list-style-type: none"> - If any cheating occurred during the examination, the student is not allowed to continue and he has to face the examination committee for enquires.
6.	<p>Plagiarism:</p> <ul style="list-style-type: none"> - If one student attends the exam on another behalf; he will be dismissed from the faculty according to the policy, rules and regulations of the university.
7.	<p>Other policies:</p> <ul style="list-style-type: none"> - All the teaching materials should be kept out the examination hall and mobile phones are not allowed. - Mutual respect should be maintained between the student and his teacher and also among students. Failing in keeping this respect is subject to the policy, rules and regulations of the university.

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