Pre-Instructional Activities					Instructional Session: pedagogical considerations						Post-Lesson activities		
Main Topic	Sub-topic	Specific Objectives/Expected learning outcomes	Lesson Environment and/Mode	Assigned resources and materials	Instructional delivery (Activities outlines)	Teacher-centred Activities (TCA)	Student-centred activities(SCA)	Formative assessment approaches (e.g feed and other forms of realtime instructional support for students	Motivation Techniques (rewards, support and encouragments etc)	Lesson Conclusion	Summative assessment and feedback activitiies	Students' Remedial Plan	Preperation for next lessoon (e.g flipping the class)
1. Overview of Computer Programming	Computer software basics	Describe user instructions to enable hardware devices and software program	Online/Hybrid	Online video resources on Youtube (Link should be added)	Open-ended questions that are connected to learning outcomes	Directed Discussion	free writes, one-sentence summary,	(1) Questions/Answers on IDE environments / Computer Systems (2) Feedback on the first program creation (Hello Word) (3) Comments from students approx 10 min. (4) LMS for streaming comments	(1) Student oral feedback through online lesson environment and rewarding the first 3 correct answers (2) Motivating the students for asking questions and rewarding the best 3 students questions	(1) Summarize the current lecture content (2) Announce the asignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Program Development Environments	Use development environments and their programming tools to create the program or software product		Online video resources on Youtube (Link should be added)	Establishing programming environment	Direct Instruction	Student will install IDE on their own computers						
	Compilation and execution	Use development environments and their programming tools to create the program or software product		Online video resources on Youtube (Link should be added)	Running programming environment.	Direct Instruction	Students do the tasks,						
	Algorithm basic concepts	Apply techniques of building blocks to develop basic programming steps in the derivation of algorithms		Online video resources on Previously recorded videos (Link should be added)	Classify concepts, define vocabulary, scaffold steps	Directed Discussion	Students do the task and team/pairs evaluate each other outcome						
	Block diagrams	Apply techniques of building blocks to develop basic programming steps in the derivation of algorithms		Online video resources on Previously recorded videos (Link should be added)	Showing and explaining examples - Example (1)	Interactive Lecture with Video-Tutorial (1)	free writes, one-sentence summary, one minute papers						
	Structure of C++ language	Explain various programming elements and sections of C++ language		Online video resources on Previously recorded videos (Link should be added)	Open-ended questions that are connected to learning outcomes	Direct Instruction	Open-ended questions that are connected to learning outcomes						
	Testing and driving a computer program in Console	Test and run programs using fundamental user interface of C++ language		LMS preparation	Group creation	List and group the students	Student practice on console input and output						
2. Variable Concepts and Operators	Basic data types	Learn basic data types and memory concept in C++ programming	Online/Hybrid	Textbook / Manuals / Mooc (Relevant chapters should be announced)	Open-ended questions that are connected to learning outcomes	Directed Discussion	Students focus on their learning process through application with Mobile Game (1)	Group work/team project with Case-Study (1) to make students applying course knowledge to produce something	Reward System for assignments (League of programming concept - LOP)	(1) Summarize the current lecture content (2) Announce the assignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Constants and variables	Demonstrate and apply techniques of declaring and initializing variables		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Open-ended questions that are connected to learning outcomes	Directed Instruction	Student practice on computer						
	Numeric types, operations	Identify all numeric types and operations.		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Multiple-choice items, solving a problem, comparing and filling in lecture notes,	presenting material and answering student questions	Student practice on computer						
	Assignments	Learn assignment operators' syntax to assign values to variables		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Open-ended questions that are connected to learning outcomes	Demonstration w/IDE Student	Suprise questions (Equiz-1) to motivate students to do the readings						
	Type casting	Choose appropriate primitive data types and become familiar with the casting technique to enable the conversion of one data type into another		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Applying course content to real-world engineering examples	Demonstration w/IDE	Student practice on computer						
3. Decision Making I	Logical expressions	Identify true and false Boolean expressions to apply on relational or arithmetic tests	Online/Hybrid	Textbook / Manuals / Mooc (Relevant chapters should be announced)	Illustration of Boolen expressions with real life examples	presenting material and answering student questions	free writes, one-sentence summary, one minute papers	(1) Questions/Answers on Mobile Game and IDE tutorial	Leauge of programming (LOP) challange	(1) Summarize the current lecture content (2) Announce the assignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except the lecture itself)	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Conditional statements	Create an algorithmic hypothesis and execute sequentially to conclude statement		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Presenting conditional statement examples	Demonstration w/ IDE	Students focus on their learning process through application with Mobile Game (2)						
	Comparison operators	Perform evaluation between numbers or strings		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Applying course content to real-world engineering examples	Demonstration w/IDE	Student practice on computer						
4. Desicion Making II	Switch statement	Learn selection control mechanism based on the evaluated value	Online/Hybrid	Online video resources on Youtube (Link should be added)	Applying course content to real-world engineering examples	Demonstration w/IDE	Student practice on computer	Group work/team project with Case-Study (2) to make students applying course knowledge to produce something	Leauge of programming (LOP) challange	(1) Summarize the current lecture content (2) Announce the assignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except the lecture itself)	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Complicated conditions implementation	Demonstrate complex decision-making algorithms in a nested structure		Online video resources on Youtube (Link should be added)	Showing and explaining examples - Example (2)	Interactive Lecture with Video-Tutorial (2)	free writes, one-sentence summary, one minute papers						
	Conditional flow control	Alter flow of statements and redirect flow of the program		Online video resources on Youtube (Link should be added)	Multiple-choice items, solving a problem, comparing and filling in lecture notes,	Demonstration w/IDE Student	Student practice on computer						
5. Repetition and Loop Statements	Cyclic algorithms	Learn to form multiple execution of a set of instructions in a loop body	Online/Hybrid	Online video resources on Youtube (Link should be added)	Applying course content to real-world engineering examples	Demonstration w/IDE Student	Student practice on computer	Short comparative assessments for. E-quiz	Leauge of programming (LOP) challange	(1) Summarize the current lecture content (2) Announce the assignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Loop operators with parameter, precondition and postcondition	Identify pre and postconditions to execute algorithms		Online video resources on Youtube (Link should be added)	Applying course content to real-world engineering examples	presenting material and answering student questions	free writes, one-sentence summary, one minute papers						
	Infinite loops	Create infinite loop execute repeatedly and Learn exit strategies in the means of better user interface		Online video resources on Youtube (Link should be added)	Review and critique infinite loop studies	Demonstration w/IDE Student	Conceptual questions (Equiz-2) to motivate students to do the readings						
6. Modular Programming 1	void function (procedure) and function returning a value	Learn functions to perform tasks including group of statements	Face to Face	Textbook / Manuals / Mooc (Relevant chapters should be announced)	Encourage students to take notes on key points	presenting material and answering student questions	Students focus on their learning process through application with Mobile Game (3)	Short comparative assessments for E-quiz (3)	Leauge of programming (LOP) challange	(1) Summarize the current lecture content (2) Announce the assignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Function with argument(s)	Define functions with arguments and learn passing values to functions		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Encourage students to take notes on key points	Demonstration w/IDE Student	Student practice on computer						
	Function returning a value	Understand return type value during function declarations		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Review and critique function ouput parameters	Demonstration w/IDE Student	Conceptual questions (Equiz-3) to motivate students to do the readings						
				Textbook / Manuals / Mooc (Relevant chapters should be announced)	Encourage students to solve certain problems easily compare with iterative ways.	Demonstration w/IDE Student	Student practice on computer						
7. Modular Programming 2	Scope rules	Perform variable declaration in a designated scope that helps to determine data accession in a particular piece of code	Online/Hybrid	Online video resources on Youtube (Link should be added)	Applying course content to real-world engineering examples	Lecturing w/ slides	free writes, one-sentence summary, one minute papers	Group work/team project with Case-Study (3) to make students applying course knowledge to produce something	Leauge of programming (LOP) challange	(1) Summarize the current lecture content (2) Announce the assignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except the lecture itself)	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Local and global variables	Use global and local variables within scope of a function		Online video resources on Youtube (Link should be added)	Showing and explaining examples - Example (3)	Interactive Lecture with Video-Tutorial (3)	free writes, one-sentence summary, one minute papers						
	Static data types	Define scope and lifetime of a variable		Online video resources on Youtube (Link should be added)	Open-ended questions that are connected to learning outcomes	Lecturing w/ slides	free writes, one-sentence summary, one minute papers						
	Recursion - simple and mutual recursion	Divide algorithmic problem into smaller program and solve recursively		Online video resources on Youtube (Link should be added)	Applying course content to real-world engineering examples	Demonstration w/IDE Student	Conceptual questions (Equiz-4) to motivate students to do the readings						
8. Array Data Collection	Declaring and using arrays	Identify array elements. Declare and initialize array items	Online/Hybrid	Textbook / Manuals / Mooc (Relevant chapters should be announced)	Encourage students to take notes on key points	Lecturing w/ slides	Students focus on their learning process through application with Mobile Game (4)	Group work/team project with Case-Study (4) to make students applying course knowledge to produce something	Leauge of programming (LOP) challange	(1) Summarize the current lecture content (2) Announce the assignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Indexing and storing data in arrays	Demonstrate storing data into fixed-sized sequential 2D array structure and calling them specific index point		Textbook / Manuals / Mooc (Relevant chapters should be announced)	work in groups/teams to solve a specific open-ended problem	Demonstration w/IDE Student	Students focus on their learning process through application						
	Basic searching and sorting algorithms	Perform data retrieval from a array structure and perform data sorting in ascending or descending order		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Review and critique serching studies	Demonstration w/IDE Student	Students focus on their learning process through application						
	Multidimensional arrays	Learn how to declare, access, and use multidimensional arrays efficiently in your algorithm		Textbook / Manuals / Mooc (Relevant chapters should be announced)	work in groups/teams to solve a specific open-ended problem	Demonstration w/IDE Student	Students focus on their learning process through application						
	Data tabular form	Create better information presentation as table form with rows and columns		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Review and critique serching studies	Demonstration w/IDE Student	Students focus on their learning process through application						
9. Pointers and References	Pointers	Learn memory concept and accessing memory address of another variable using pointers and references	Online/Hybrid	Textbook / Manuals / Mooc (Relevant chapters should be announced)	Encourage students to take notes on key points	Lecturing w/ slides	Students focus on their learning process through application with Mobile Game (5)	(1) Questions/Answers on Pointer Usage (2) The success rate of classroom games (3) Comments from students approx 10 min. (4) LMS for streaming comments	Student oral feedback through online lesson environment Rewarding the first 3 correct answers Rewarding the best 3 students questions Rewarding the successfull students iin classroom games Rewarding the first student completing coding sample	(1) Summarize the current lecture content (2) Announce the assignment for the lecture (3) Brief introduction to the next lecture (Relevant chapter from the book should be shared)	(1) Homework or (2) Take home exam (3) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except the lecture itself)	(1) Videos of previous year's lecture (Link should be shared) (2) Reference book chapter (3) Homework assignment which includes the basics of the next lecture or (4) Basic surprise quiz in the beginning of the next lecture (the contents should be generic)
	Passing parameters to functions by reference	Demonstrate better memory management using pointers and references.		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Pointer Illustration	Demonstration w/IDE	Student practice on computer						
	Pointers to functions	Learn how to improve performance of code using function pointers and prevent code redundancy		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Stack and Heap Illustration	Demonstration w/IDE	Student practice on computer						
	Data stack and heap	Establish the fundamental differences between stack and heap memory		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Showing and explaining examples - Example (4)	Interactive Lecture with Video-Tutorial (4)	free writes, one-sentence summary, one minute papers						
	Memory allocation	Learn how to give programs the ability to dynamically allocate parts of memory at their request and release that memory for re-use when it is no longer required		Textbook / Manuals / Mooc (Relevant chapters should be announced)	Encourage students to take notes on key points	presenting material and answering student questions	free writes, one-sentence summary, one minute papers						
10. Strings	Strings and characters: Basic Concepts	Learn data representation with collection of character data type	Online/Hybrid	Online video resources on Youtube (Link should be added)	Showing and explaining examples - Example (5)	Interactive Lecture with Video-Tutorial (5)	free writes, one-sentence summary, one minute papers	Group work/team project with Case-Study (5) to make students applying course knowledge to produce something	Student oral feedback through online lesson environment Rewarding the first 3 correct answers Rewarding the best 3 students questions Rewarding the successfull students iin classroom games Rewarding the first student completing coding sample	(1) Summarize the current lecture content	(1) Supplying feedback form for the lecture which has basic indicators such as difficulty of the lecture, how well the lecture is explained, how well they learn the subject, etc.	(1) Revisiting the recorded video of lecture (2) Office hours for the Lecturer or the teaching assistant (3) Sharing the lecture notes (4) Counseling (5) Lesson tutorials/drills/simulations (Links should be shared) (6) Off-topic meetings (1 hour meeting with students to discuss about anything except the lecture itself)	
	Functions in the String Library	Demonstrate simple string operations using string library function		Online video resources on Youtube (Link should be added)	Open-ended questions that are connected to learning outcomes	Lecturing w/ slides	Conceptual questions (Equiz-5) to motivate students to do the readings						
	Data conversions between String and Number	Demonstrate competence in data protection (avoiding loss) or being corrupted by keeping the integrity between string and numbers		Online video resources on Youtube (Link should be added)	Applying course content to real-world engineering examples	Demonstration w/IDE Student	Student practice on computer						