BAGONG PILIPINAS

OUTCOMES-BASED COURSE SYLLABUS

COURSE INFORMATION					
Course Code	**PBDIT501**	**Course Title**	**Fundamentals of Programming**	**Course Credit**	3 units
Course Description					
Pre-Requisites		**Co-Requisites**	None		
Vision	**A Leading Comprehensive Polytechnic University in Asia**				
Mission	Advance an inclusive, equitable, and globally relevant polytechnic education towards national development.				
Strategic Goals	**Pillar 1: Teaching and Learning** **SG 1**: Innovative Curricula and Instruction **SG 2**: Empowered, Expert, and Productive Faculty Members **SG 3**: Holistic Student Development **Pillar 2: Research and Extension** **SG 4**: Intensified Research Innovation, Dissemination and Utilization **SG 5**: Strengthened Sustainable and Impactful Extension Program **SG 6**: Expanded Research and Extension Networks with Local, National, and International Partners **Pillar 3: Internal Governance** **SG 7**: Transformational University Leadership **SG 8**: Judicious and Ethical Stewardship of Physical and Financial Resources **SG 9**: Effective and Efficient Human Resource Management **SG 10**: Excellent Citizen/Client Satisfaction **SG 11**: Smart Campuses				

COLLEGE GOAL	**Mission** The Open University is committed to provide quality education through the open and distance learning system, which is responsive to the needs and challenges of a technologically advanced and globally linked society. **Goals** • Relevant degree and non-degree graduate and undergraduate programs; • Innovative teaching-learning systems; • E-learning; • Effective and efficient technology-based instructional strategies and approaches; • State-of-the-art instructional materials; • Pertinent and productive researches; • E-linked; and • Quality administrators, subject specialists and graduates.
QUALITY POLICY STATEMENT	The Polytechnic University of the Philippines commits to provide inclusive and equitable quality education and promote lifelong learning opportunities for human advancement and social transformation through re-engineered polytechnic academic programs. Toward this end, we, the members of the PUP Community will vigorously and steadfastly endeavor to continuously improve the standard of university services to the satisfaction of our clients through the adoption and continuous review of our Quality Management System.

INSTITUTIONAL LEARNING OUTCOMES (ILO)	As a polytechnic state university, PUP shall develop its students to possess: 1. **Critical and Creative Thinking**. Graduates use their rational and reflective thinking as well as innovative abilities to life situations in order to push boundaries, realize possibilities, and deepen their interdisciplinary, multidisciplinary, and/or transdisciplinary understanding of the world. 2. **Effective Communication.** Graduates apply the four macro skills in communication (reading, writing, listening, and speaking), through conventional and digital means, and are able to use these skills in solving problems, making decisions, and articulating thoughts when engaging with people in various circumstances. 3. **Strong Service Orientation.** Graduates exemplify strong commitment to service excellence for the people, the clientele, industry, and other sectors. 4. **Adept and Responsible Use or Development of Technology.** Graduates demonstrate optimized and responsible use of state-of-the-art technologies of their profession. They possess digital learning abilities, including technical, numerical, and/or technopreneurial skills. 5. **Passion for Lifelong Learning.** Graduates perform and function in society by taking responsibility in their quest for further improvement through lifelong learning. 6. **Leadership and Organizational Skills.** Graduates assume leadership roles and become leading professionals in their respective disciplines by equipping them with appropriate organizational skills. 7. **Personal and Professional Ethics.** Graduates manifest integrity and adherence to moral and ethical principles in their personal and professional circumstances. 8. **Resilience and Agility**. Graduates demonstrate flexibility and the growth mindset to adapt and thrive in the volatile, uncertain, complex, and ambiguous (VUCA) environment. 9. **National and Global Responsiveness.** Graduates exhibit a deep sense of nationalism as it complements the need to live as part of the global community where diversity is respected. They promote and fulfill various advocacies for human and social development.

		Alignment to ILOs								
		1	2	3	4	5	6	7	8	9
Program Learning Outcomes	1. Engage in independent and collaborative learning for continual development and growth as a computing professional	/	/		/		/			/
	2. Demonstrate the ability to evaluate solutions for complex problems	/			/		/			
	3. Apply modern computing technologies in developing computing solutions	/			/		/			

PERFORMANCE INDICATORS		Alignment to PLOs						
		1	2	3	4	5	6	7
	1.Participate in activities that enhance professional collaboration and lead to personal growth and career development.	/						
	2. Maintain professional integrity by adhering to the ethical standards and behaviors and discerning boundaries of competence	/						
	3. Keeping abreast with the current trends and developments in the field.	/						
	4. Involvement in socially relevant projects involving the preservation and promotion of Filipino historical and cultural heritage and values, as well as the uplifting of the lives of Filipinos.	/						
	5. Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to defined and applied computing procedures, processes, systems, or methodologies		/					
	6. Identify, formulate, research literature, and solve broadly defined computing problems reaching substantiated conclusions using analytical tools appropriate to the discipline or area of specialization.		/					
	7. Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to computing technologist practice.		/					
	8. Articulate one's possible contributions to society and nation building.		/					
	9. Design solutions for broadly defined computing technology problems and contribute to the design of systems, components, or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.			/				
	10. Select and apply appropriate techniques, resources, and modern computing tools to broadly defined computing activities, with an understanding of the limitations.			/				

COURSE LEARNING OUTCOMES Fundamentals of Programming	Upon completion of the course, students should be able to:	Alignment to PIs										
		1	2	3	4	5	6	7	8	9	10	11
	1. Knowledge and understand the program planning and development principles					/	/					
	2. Design, implement, test, and debug programs that utilize primitive data types, expressions, and operators for basic computations					/				/		
	3. Apply simple input and output operations to interact with users effectively in C programs.					/					/	
	4. Construct conditional and iterative structures to represent logical decision-making and repetitive tasks.					/	/					
	5. Define and utilize functions with appropriate parameter passing to achieve modular programming and code reusability.					/				/		
	6. Simulate and analyze programming solutions involving arrays, strings, and pointers, applying accepted principles and practices					/	/				/	
	7. Differentiate between predefined library functions and user-defined functions, demonstrating proper usage in program development.					/					/	
	8. Integrate structured data types (e.g., structures) in problem-solving to manage more complex program requirement					/				/		
	9. Apply logical formulation and problem-solving strategies in developing programs that address real-life ICT scenarios while considering ethical, cultural, social, and environmental impacts.							/	/	/		
	10. Exhibit consistent eagerness for continuous learning by adopting best practices, debugging strategies, and professional standards in programming.	/	/	/								

Legend: L – learn, P – practice, O – opportunity for development

OUTCOMES-BASED TEACHING AND LEARNING PLAN (OBTL PLAN)

Week (18 Weeks)	Desired Learning Outcomes (DLOs)	Alignment to CLOs	Learning Content/Topics	Instructional Delivery Design		Assessment Tasks (TAs)
				Flexible Learning and Teaching Activities (FLTAs)		
				Synchronous	Asynchronous	
Week 1 (A) September 6	a. Demonstrate a sense of readiness for the upcoming semester. b. Identify their learning outcomes and expectations for the course. c. Recognize their capacity to create new understandings from reflecting on the course.	CLO 1	1. Introduction to the Course a. Vision, Mission, Goals and Objective of the University b. Self-Introduction c. Course Overview d. Grading System e. Classroom Management f. Accomplish online class agreement		1. Submit self-introduction via discussion forum 2. Submit duly accomplished online class agreement in the submission bin	
Week 2 (S) September 13	**UNIT 1: COMPUTER AND PROGRAMMING CONCEPTS**	CLO 1-3	1. Overview of Computer Hardware and Software 2. Computer Language 3. Types of Computer Language 4. Steps in Program Development 4.1. Analyze programming problems 4.2. Design algorithms through flowchart 4.3. Implement algorithms 4.4. Test and verify program **4.5.** Maintain and update program	1. Discussion Deck 2. Analyzing Problems and Designing algorithms through flowchart 3. Demonstration		Recitation Homework

Week 3 (A) **September 20**	**UNIT 2: INTRODUCTION TO C PROGRAMMING WITH BASIC STRCUTURE DEMONSTRATION**	CLO 1-3 CLO 5-7	1. Background of C 2. Compilation Process 3. C Program Structure and Tokens 4. Hello World 5. Data Types 6. Variable 6.1. Initialization 6.2. Declaration 6.3. Assignment 6.4. Constants 7. Standard Input/Output 8. Console Input/Output		1. Video Guides/Lecture 2. Reading Materials 3. Discussion Deck	IDE Setup Machine problem (Tandem Programming)
Week 4 (A) **September 27**	**UNIT 3: EXPRESSIONS**	CLO 2,4,6	1. Arithmetic 2. Relational 3. Logical 4. Increment/Decrement 5. Operator Precedence 6. Operator Associativity		1. Video References 2. Reading Materials with sample codes 3. Research on additional information on the topic discussed	Machine Problem (Individual)
Week 5 (S) **October 5**	**UNIT 4: FLOW CONTROL**	CLO 2,4,5,7	1. Conditional Statements 1.1. If 1.2. If-else 1.3. Nested if 1.4. Switch 2. Jump Statements 2.1. Goto 2.2. Return 2.3. Break 2.4. Continue	1. Discussion Deck 2. Analyzing Problems and Designing algorithms through flowchart 3. Demonstration 4. Group Programming		Recitation Synchronous Machine Problem Homework Machine Problem

Week 6 (A) **October 12**	***QUIZ***		**KNOWLEDGE CHECK**	QUIZ		Long Quiz
Week 7 (A) **October 19**	**UNIT 4: FLOW CONTROL Cont.**	CLO 1,2,4,6,9	1. Iteration Statements 1.1. Event Controlled 1.2. Count Controlled 2. Type Conversion Common Pitfalls		1. Video References 2. Reading Materials with sample codes 3. Research on additional information on the topic discussed	Machine Problem (Individual)
Week 8 (S) **October 26**	**UNIT 5: ARRAY**	CLO 2,4,5,6	1. Array Types **1.1.** Single-Dimension **1.2.** Multi-Dimension 2. Declaration and Initialization 3. Accessing and operating on array elements	1. Discussion Deck 2. Analyzing Problems and Designing algorithms through flowchart 3. Group Programming		Recitation Synchronous Machine Problem Homework Machine Problem
Week 9 (A) **November 9**	MULTIPLE MACHINE LEARNING PROBLEM		**CODING EXERCISES**		CODING PROBLEM	Homework Machine Problem
Week 10 (A) **November 16**	***MIDTERM EXAM***	-	**5. KNOWLEDGE CHECK**	MIDTERM EXAM		
Week 11 (A) **November 23**	**UNIT 5: ARRAY CONTINUATION**	CLO 2,4,5,6	Sorting Algorithms		1. Video References 2. Reading Materials with sample codes 3. Research on additional information on the topic discussed	Machine Problem (Individual)

Week 12 (A) **November 30**	MULTIPLE MACHINE LEARNING PROBLEM		**CODING EXERCISES**		CODING PROBLEM	Homework Machine Problem
Week 13 (S) **December 7**	**UNIT 6: FUNCTIONS** **FINAL PROJECT ANNOUNCEMENT**	CLO 1,2,5,6,7,9	1. Functions Types 1.1. Library Functions 1.2. User Defined Functions 2. Function Parameters 2.1. Pass by Value 2.2. Pass by Parameter 3. Scope and Lifetime of Variables 4. Recursion	1. Discussion Deck 2. Analyzing Problems and Designing algorithms through flowchart 3. Group Programming		Recitation Synchronous Machine Problem Homework Machine Problem
Week 14 (A) **December 14**	***QUIZ***	-	**KNOWLEDGE CHECK**		QUIZ	
Week 15 (S) **December 21**	**UNIT 7: FILE HANDLING**	CLO 2,3,4	1. Create File 2. Open File 3. Reading From a File 4. Closing From A file		1. Video References 2. Reading Materials with sample codes 3. Research on additional information on the topic discussed	
Week 16 (A) **January 11**	**FINAL PROJECT SUBMISSION**	CLO 1-10				
Week 17 (S) **January 18**	**FINAL EXAM**		**FINAL KNOWLEDGE ASSESSMENT**		Theoretical and Coding Exam	

BOOKS/ COURSE REFERENCES:

1. Farrel, Joyce. Prog. Logic & Design Comprehensive. Course Technology Ptr. 2006.
2. Hanley, Jeri and Koffman, Elliot. Problem Solving & Program Design in C 2nd Ed. 2004
3. Ullman, Larry and Liyanage, Marc. C Programming: Visual Quick Start. Pearson Educ. (Asia). 2005.
4. Shildt, Herbert. Turbo C/C++ the Complete Reference , Mc-GrawHill Osborne Media. 2003.
5. The C Programming Language by Brian Kerningham, Dennis M. Ritchie, 2nd edition, April 1, 1988
6. C Programming: a Modern Review by K.N. King, 2nd edition
7. Absolute Beginner's Guide to C, 2nd edtion by Greg Perry

CLASSROOM POLICIES (to be filled out by the assigned faculty)	
FACE-TO-FACE DELIVERY	**FLEXIBLE TEACHING AND LEARNING ACTIVITIES (FLTAs)**
	Synchronous sessions 1. Check your device ahead of your scheduled synchronous meeting (camera, microphone, keyboard, speakers, etc.) 2. Attend the synchronous class on time. 3. Be ready to turn on your microphone and camera anytime. 4. Choose a comfortable space to attend the online class. 5. Click the 'raise hand' button and wait to be acknowledged by the teacher(s) before unmuting your microphone. 6. Do not abuse the chatbox. 7. Read the assigned materials before attending the class. 8. Be mindful of your classmates and teacher's time. Be alert, constructive, and responsive. **Asynchronous sessions** 1. Study the sections and functions of the assigned learning management system (LMS) ahead of time. 2. Check the expected submission/turn in schedule at all times. For some timed activities, late submission may cause deductions to your grades. For group activities, discuss the best time and platform to discuss the assignment of tasks with your groupmates. 3. Ask for help from your teacher(s) and classmates when necessary. 4. (Follow the rules on sending an effective email to your teacher. A separate discussion shall be allotted for this.)

COURSE REQUIREMENT/S with CLO links	GRADING SYSTEM
• Discussion Forum (eMabini Portal) **(CLOs 1, 2, and 3)** • Presentation of Plan **(CLOs 1, 2, and 3)** • Final Paper **(CLOs 1, 2, and 3)**	**MIDTERM AND FINAL TERM** **CLASS STANDING 70%** Class Participation (5) Quizzes (20) Projects (20) Machine problem Exercises (25) **MAJOR EXAMINATION 30%** **FINAL GRADE = (MIDTERM GRADE + FINAL TERM GRADE)/2**

Rubrics for Assessment

A. Project/Program Rubric

		Rating	Criteria
A.	**Program Design 25%**	25	Solution well thought out
		15	Solution partially planned out
		5	Ad hoc solution, program "designed at the keyboard"
		Rating	**Criteria**
B.	**Program Execution 20%**	20	Program runs correctly
		12	Program produces correct output half of the time
		4	Program runs, but mostly incorrect
		0	Program does not compile or run at all
		Rating	**Criteria**
C.	**Specification Satisfaction 25%**	25	Program satisfies specification completely and correctly
		15	Many parts of the specification not implemented
		5	Program does not satisfy specification
	Passing is a raw score of 60, ZERO BASED		

		Rating	Criteria
D.	**Coding Style 20%**	20	Well-formatted, understandable coed; appropriate use of language capabilities
		12	Code hard to follow in one reading; poor use of language capabilities
		4	Incomprehensive code, appropriate language capabilities not used
		Rating	**Criteria**
E.	**Comments 10%**	10	Concise, meaningful, well-formatted comments
		6	Partial, poorly written or poorly formatted comments
		4	Wordy, unnecessary, incorrect, or badly formatted comments
		0	No comments at all
		Rating	**Criteria**
F.	**Extra Credits 5%**	4	Programs that usefully extend the requirements
		3	Programs that use a particularly good algorithm
		3	Program that are particularly well written or use the capabilities of the language particularly well

B. Homework/Schoolwork Rubric

CRITERIA	GRADING SCALE			
COMPLETION *How much of the assignment was completed?*	**4** The entire assignment was completed	**3** ¾ of the assignment was completed	**2** At lease ½ of the assignment was completed	**1** Less than ½ of the assignment was completed
ACCURACY *How much of the assignment was done right?*	**4** The entire assignment (or almost all) of the assignment was done correctly.	**3** ¾ of the assignment was done correctly.	**2** At lease ½ of the assignment was done correctly.	**1** Less than ½ of the assignment was done correctly.
LEGIBILITY/NEATNESS *Can the work pass the stranger test?*	**4** Very neat. Writing illustrates a lot of thought and preparation.	**3** Mostly neat and legible. Writing illustrates some thought and preparation.	**2** Slightly legible. Writing illustrates little thought and preparation.	**1** Not legible. Hard to read. Ideas expressed are difficult to understand
DIRECTIONS *Did you follow directions?* *Was the assignment completed showing all work?*	**4** The assignment was done showing lots of work neatly and easily followed.	**3** The assignment was done showing most of the work.	**2** The assignment was done showing some work.	**1** The assignment was answers only
EFFORT *The student worked at what level of their ability?*	**4** Outstanding work, the student should be proud of their effort	**3** Good effort was made and the student met the expectations.	**2** Some effort was made and the student just did enough work.	**1** Minimal effort was given. The student just should try harder.
TIME MANAGEMENT *Was the assignment turned in on time?*	**4** The assignment was turned in on time	**3** The assignment was turned in one day late.	**2** The assignment was turned in two days late.	**1** The assignment was turned in more than two days late.

CLASS INFORMATION	FACULTY INFORMATION
Section: N/A	**Name of Faculty:**
Time:	**Consultation Time:**
Room:	**Office Tel. No./ Mobile Phone No.**
Semester: Second Semester, AY 2024-2025	**Institutional Email:**

Prepared by:	Reviewed and checked by:	Recommending Approval:	Approved by:
MARLA SABADO VASQUEZ Course Specialist	ASSOC. PROF. MARIAN C. ORTIZ, MAF Director, IODE	DR. RUDOLF ANTHONY A. LACERNA, DEM, DR&DM Executive Director, OUS	DR. EMANUEL C. DE GUZMAN, PhD Vice President for Academic Affairs