Course Code	PEU4301					
Level	04					
Course Title	Real Analysis II					
Credit value	3					
Core/Optional	Core for Pure Mathematics as major discipline					
Prerequisites	PEU4300 (Pass/Valid OCAM / CR)					
Hourly breakdown	**Theory**		**Practical hours**	**Independent Learning**	**Assessments**	**Total hrs**
	25 X 2 = 50 hrs	DS hrs = 4*3=12hrs		▪ (25 x 3)=75 hrs ▪ Online /Audio-visual materials and other learning resources(11hrs)	▪ Continuous Assessments (CA)(2 hrs)	150
Course Aim/s.	To introduce concept of limits of a function, continuity of a function, differentiability of a function and their applications.					
PLOs addressed by course	**PLO1: Knowledge:** Explain the fundamental, principles and broader knowledge pertaining to the chosen science disciplines offered for the degree. **PLO3: Communication**: Demonstrate the competency in communicating efficiently and effectively to present information, ideas and concepts to the scientific community as well as to the wider society. **PLO5: Creativity and Problem Solving:** Identify and analyze problems using quantitative and/or qualitative approaches using scientific methodology to provide valid conclusions. **PLO9: Lifelong Learning**: Develop the capacity to foresee new trends and their impacts and continuously update knowledge and develop skills willingly to meet those future challenges.					
Course Learning Outcomes (CLO)	At the completion of this course student will be able to CLO1: use the meaning (logical) of limit to prove or disprove limits of a function. (PLO1,3,5) CLO2: use the meaning (logical) of continuity of a function at a point to prove or disprove continuity of a function at a point and on an interval. (PLO1,3,5) CLO3: write simple proofs about continuity and uniform continuity of simple functions. (PLO1,3,5) CLO4: use the meaning (logical) of derivative to prove or disprove derivatives. (PLO1,3,5,9) CLO5: use the meaning (logical) of differentiability of a function at point to prove or disprove differentiability of a function at a point and on an interval. (PLO1,3,5,9) CLO6: to write simple proofs about differentiability of simple functions. (PLO1,3,5,9)					
Content (Main topics, sub topics)	**Continous function:** Limit at a point, Right limit at a point, Left limit at a point, Algebra of Limits, Squeezing Theorem, Limits of composition, Sufficiency of Sequences, Infinite Limits, Limits at Infinity, Algebra of Limits at Infinity, Left Continuity at a point, Right Continuity at a point, Continuity at a point, Continuity on an interval. **Differentiable functions:** Discontinuities, Continuity on a closed and bounded interval, Images of intervals under continues functions, Sufficiency of Sequence in Continuity, Algebra of Continuous functions, Limits of Composite functions, Monotone functions, Convex functions, Intermediate Theorem, Uniform Continuity. Derivative and Differentiability at a point, Left Derivative, Right Derivative, Algebra of Differentiable functions, Differentiability on an interval, Product Rule, Quotient Rule, Chain Rule, Continuity of Derivative, Local maxima and Local minima, Rolles Theorem, Mean value Theorems, Monotone functions, Differentiable functions, L'Hôpital's Rule, Derivatives of Higher Orders, Taylor's Theorem, Derivatives of power series, Taylor series and McClaurin Series, Exponential function, Logarithmic function, Trigonometric function, The number ð, Hyperbolic functions.					
Teaching Learning methods (TL)	Self-Learning/Independent learning of Self-study ▪ Instructional Material (IL) ▪ Online Activities (OL) ▪ Reference Work (RF) Compulsory contact sessions ▪ Assessments (AS) and Feedback – MCQs (MCQ);Structured Essay (SEQ); Essay Questions (ES); Non-compulsory contact sessions ▪ Day Schools (DS)					
Assessment strategy	Overall Continuous Assessment Mark (OCAM): 40%			Final Assessment:60. %		
	Details : Continuous Assessment1 (CAT1): -1hr Continuous Assessment2 (CAT2): -1hr OCAM=60%Maximum(CAT1, CAT2) + 40%Minimum(CAT1, CAT2)			Final Evaluation -Theory: 100 % (2 hrs)		
Recommended Readings:	• Apostol, T.M. (1974). *Mathematical Analysis (2nd Edition)*. Addison-Wesley Publishing Company. • Binmore, K. G. (1982). *Mathematical Analysis (2nd Edition)*. Cambridge University Press. • Rudin, W. (2013). *Principles of Mathematical Analysis (3rd Edition)*. McGraw-Hill Publishers.					