<table>
<tr><td>Course Code</td><td colspan="5">PEU5304</td></tr>
<tr><td>Level</td><td colspan="5">5</td></tr>
<tr><td>Course Title</td><td colspan="5">Introduction to Complex Analysis</td></tr>
<tr><td>Credit value</td><td colspan="5">3</td></tr>
<tr><td>Core/Optional</td><td colspan="5">Core for Pure Mathematics as major discipline</td></tr>
<tr><td>Prerequisites</td><td colspan="5">PEU 4300 (pass valid OCAM)+PEU 4301(Pass valid OCAM)</td></tr>
<tr><td rowspan="2">Hourly breakdown</td><td colspan="2">Theory</td><td>Practical</td><td>Independent Learning</td><td>Assessment</td><td>Total</td></tr>
<tr><td>25*2= 50 hrs</td><td>DS hrs =4*3 = 12 hrs</td><td></td><td>25*3 = 75 hours
Online learning = 11 hours</td><td>CA = 2 hrs</td><td>150 hrs</td></tr>
<tr><td>Course Aim/s.</td><td colspan="6">Describe the definition of complex numbers, its properties, algebra of complex numbers and able to define and apply this knowledge in functions of complex variables</td></tr>
<tr><td>PLOs addressed by course</td><td colspan="6">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.
PLO4: Individual Work, Team Work and Leadership: Demonstrate the competency in working independently and in groups in addressing issues in multi-disciplinary environments and completing the tasks on time through collaborative learning while exhibiting leadership.
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.</td></tr>
<tr><td>Course Learning Outcomes (CLO)</td><td colspan="6">At the completion of this course student will be able to
CLO1 : define the fundamental concept of complex numbers and its properties (PLO1,3,4,5,9)
CLO2 : describe the complex number in the complex plane and evaluate the powers of a complex numbers (PLO1,3,4,5,9)
CLO3 : find the roots of a complex polynomial (PLO1,3,4,5,9)
CLO4 : define and evaluate the values of some complex functions (PLO1,3,4,5,9)
CLO5: define the distance function, neighborhoods in the complex plane and identify limit points of subsets of the complex plane (PLO1,3,4,5)
CLO6: determine convergence or divergence of a sequence of complex numbers and test the convergence or divergence of a series of complex numbers (PLO1,3,4,5,9)
CLO7: find the limit of a complex valued function at a point and determine the continuity of a function (PLO1,3,4,5,9)
CLO8: use Cauchy-Riemann equation to decide the differentiability and analyticity of a complex valued function (PLO1,3,4,5,9)</td></tr>
<tr><td>Content (Main topics, sub topics)</td><td colspan="6">Unit – I (Part A)
Path to complex numbers, Definition of a complex numbers, Algebra of complex numbers, Absence of a natural order for complex numbers, point representation of a complex numbers, Complex conjugate and absolute value, Argument of a complex numbers, Polar form of a complex numbers, Constructions and loci in the complex numbers.

Unit – I (Part B)
Integer powers of complex numbers, Rational powers of complex numbers, Zeros of a complex numbers, Complex exponential function, Complex trigonometric function, Complex hyperbolic function, Complex logarithmic function, Irrational power complex numbers, Complex power complex numbers, Inverse trigonometric and hyperbolic function.

Unit – II
The distance function, neighborhoods, limit points of a set, convergence of a complex sequence, convergence of a complex series, Tests for convergence, Limit and continuity of a complex function, Discontinuity of Argument function, Derivative of a complex function, Cauchy-Riemann equations, Analytic functions.</td></tr>
<tr><td>Teaching Learning methods (TL)</td><td colspan="6">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)</td></tr>
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Assessment strategy	Overall CA Mark (OCAM): 40%	Final Assessment: 60%
	Details: Continuous Assessment1 (CAT1): -1hr Continuous Assessment2 (CAT2): -1hr OCAM = 60%of Maximum(CAT1, CAT2) + 40%of Minimum(CAT1, CAT2)	Final Evaluation -Theory: 100%-2hrs
Recommended Readings:	▪ Saff E.B, Snider A.D. (2003). *Fundamentals of Complex Analysis with Applications to Engineering Science and Mathematics (3rd Edition)*. Pearson. ▪ Ruel V Churchill, James Brown W. (2013). *Complex variable & Applications (9th Edition)*. McGraw-Hill Education. ▪ Convey J.B. (1978). *Functions of one complex variable (2nd Edition)*. Springer- Verlag.	