NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF MATHEMATICS

COURSE PLAN – PART I			
Name of the programme and specialization	**B.Tech. Computer Science and Engineering**		
Course Title	**COMPLEX ANALYSIS AND DIFFERENTIAL EQUATIONS**		
Course Code	**MAIR21**	**No. of Credits**	**3**
Course Code of Pre-requisite subject(s)	**NIL**		
Session	**January 2020**	**Section (if, applicable)**	
Name of Faculty	**Prof. V Ravichandran**	**Department**	**Mathematics**
Official Email	**ravic@nitt.edu**	**Telephone No.**	**0431-2503665**
Name of Course Coordinator(s) (if, applicable)			
Official E-mail		**Telephone No.**	
Course Type (please tick appropriately)	☐ √ **Core course**	☐	**Elective course**

Syllabus (approved in BoS)

MAIR 21 Complex Analysis and Differential Equations

Analytic functions; Cauchy-Riemann equations; Line integral, Cauchy's integral theorem and integral formula (without proof); Taylor's series and Laurent series; Residue theorem (without proof) and its applications.

Higher order linear differential equations with constant coefficients; Second order linear differential equations with variable coefficients; Method of variation of parameters; Cauchy-Euler equation.

Laplace Transform of Standard functions, derivatives and integrals – Inverse Laplace transform – Convolution theorem – Periodic functions – solution of ordinary differential equation and simultaneous equations with constant coefficients and integral equations by Laplace Transform.

Formation of partial differential equations by eliminating arbitrary constants and functions – solution of first order equations – four standard types – Lagrange's equation. Method of separation of variables.

References:

1. James Ward Brown, Ruel Vance Churchill, *Complex Variables and Applications*, McGraw-Hill Higher Education, 2004

2. Dennis Zill, Warren S. Wright, Michael R. Cullen, *Advanced Engineering Mathematics*, Jones & Bartlett Learning, 2011

3. Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley & Sons, 2019.

4. William E. Boyce, Richard C. DiPrima, Douglas B. Meade, *Elementary Differential Equations and Boundary Value Problems*, Wiley, 2017.

5. Ian N. Sneddon, *Elements of Partial Differential Equations*, Courier Corporation, 2013

COURSE OBJECTIVES

The course presents

1. an introduction to analytic functions and power series.
2. various Cauchy' theorems and its applications in evaluation of integral.
3. various approach to find general solution of the ordinary differential
4. Laplace transform techniques to find solution of differential equations
5. Partial differential equations and methods to find solution of it.

MAPPING OF COs with POs

Course Outcomes	**Programme Outcomes (PO)** (Enter Numbers only)
understand analytic functions discuss its properties and obtain series representation of analytic functions	
classify singularities and derive Laurent series expansion and evaluate various integrals by using Cauchy's residue theorem	
find the solutions of first and some higher order ordinary differential equations	
Find Laplace transform of a given function and its inverse Laplace transform.	

Find solution of first order partial differential equations.	

COURSE PLAN – PART II

COURSE OVERVIEW

This course will introudce the basics of the functions of complex variable and of differential equations both ordinary and partial differential equations.

COURSE TEACHING AND LEARNING ACTIVITIES (Add more rows)

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1st, 2nd & 3rd week	Analytic functions; Cauchy-Riemann equations; Line integral, Cauchy's integral theorem and integral formula (without proof); Taylor's series and Laurent series; Residue theorem (without proof) and its applications.	Chalk and Talk
2	4th & 5th week	Higher order linear differential equations with constant coefficients; Second order linear differential equations with variable coefficients	Chalk and Talk
3	**6th week**	Class Test I	
4	6th, 7th & 8th week	Method of variation of parameters; Cauchy-Euler equation. Laplace Transform of Standard functions, derivatives and integrals – Inverse Laplace transform – Convolution theorem	Chalk and Talk
5	9th & 10th week	Periodic functions – solution of ordinary differential equation and simultaneous equations with constant coefficients and integral equations by Laplace Transform.	Chalk and Talk
6	11th week	Class Test II and Assignment Test	
7	11th & 12th week	Formation of partial differential equations by eliminating arbitrary constants and functions – solution of first order equations – four standard types – Lagrange's equation. Method of separation of variables.	Chalk and Talk
8	13th or 14th week	**Assessment 4 (Semester examination)**	

		(Portion: all the topics)	

COURSE ASSESSMENT METHODS (shall range from 4 to 6**)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Class Test I	6th week	60 minutes	20%
2	Assignment Test	11th week	30 minutes	10%
3	Class Test II	11th week	60 minutes	20%
CPA	Compensation Assessment*	12th week	60 minutes	
4	Final Assessment *	13th or 14th week	3 hours	50%

***mandatory; refer to guidelines on page 6**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

Feedback may be given anytime in person or through email.

COURSE POLICY (including compensation assessment to be specified**)**

MODE OF CORRESPONDENCE (email/ phone etc)

One can meet me in my office anytime during office hours (no appointments required) or can contact at 0*431-250-3665 (*intercom no. 3665). Class Representative can reach me through whatsapp.

COMPENSATION ASSESSMENT POLICY

Compensation assessment will be conducted only for those who have made request before the particular assessment provided that such request is accepted by me.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY

Students can reach course faculty by fixing appointment through E-mail (ravic@nitt.edu) or phone (0431-250-3665 or intercom: 3665).

FOR APPROVAL

Prof. V. Ravichandran Course Faculty	CC- Chairperson 14 Jan '20	HOD 14/1/2020

Guidelines

a) The number of assessments for any theory course shall range from 4 to 6.

b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.

c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.

d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.

f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.

g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.