NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF MATHEMATICS

COURSE PLAN – PART I			
Name of the programme and specialization	**M. Sc. Mathematics**		
Course Title	**COMPLEX ANALYSIS**		
Course Code	**MA 704**	**No. of Credits**	**3**
Course Code of Pre-requisite subject(s)	**MA 701 REAL ANALYSIS**		
Session	**January 2020**	**Section (if, applicable)**	
Name of Faculty	**Prof. V Ravichandran**	**Department**	**Mathematics**
Official Email	**ravic@nitt.edu**	**Telephone No.**	**0431-2503674**
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)

MA704 Complex Analysis

Lines and planes in complex plane, extended complex plane, spherical representation, power series, analytic functions as mappings, branch of logarithm, conformal mappings, Mobius transformations.

Power series representation of analytic functions, zeros of analytic functions, index of a closed curve, Cauchy's theorem and integral formula on open subsets of C.

Homotopy, homotopic version of Cauchy's theorem, simple connectedness, counting of zeros, open mapping theorem, Goursat's theorem, Classification of singularities, Laurent series.

Residue, Contour integration, argument principle, Rouche's theorem, Maximum principle, Schwarz' lemma.

Reference Books:

1. Conway John. Functions of One Complex Variables. 2nd ed, Narosa, New Delhi. 2002.

2. Ahlfors Lars. Complex Analysis. McGraw Hill Co., New York. 1988.

3. Hahn Liang-Shin and Epstein Bernard. Classical Complex Analysis. Jones and Bartlett India, New Delhi. 2011.

4. Rudin Walter. Real and Complex Analysis. McGraw-Hill. 1987.

5. Ullrich David. Complex Made Simple. American Math. Soc., Washington DC. 2008.

COURSE OBJECTIVES

The course presents an introduction to analytic functions, conformal mappings, Mobius transformations and power series. Various Cauchy' theorems are discussed and used in evaluation of integral. It deals with locations of zeros of analytic functions and maximum principles.

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
understand analytic functions as mappings and discuss properties of conforma and Mobius transformations	**a,b,c,d e**
obtain series representation of analytic functions	**a,b,c,d,e**
evaluate various integrals by using Cauchy's residue theorem	**a,b,c,d,e**
classify singularities and derive Laurent series expansion	**a,b,c,d,e**

COURSE PLAN – PART II

COURSE OVERVIEW

This course will introudce the basics of the functions of complex variable. Beginning with mapping properties, it goes on to deal with power series, integration. As applications, real valued integrals are evaluted using residue theorem. It ends with a fundamental lemma known as Schwarz lemma.

COURSE TEACHING AND LEARNING ACTIVITIES (Add more rows)			
S.No.	**Week/Contact Hours**	**Topic**	**Mode of Delivery**
1	1st, 2nd & 3rd week	Lines and planes in complex plane, extended complex plane, spherical representation, power series, analytic functions as mappings, branch of logarithm, conformal mappings, Mobius transformations.	Chalk and Talk* Via MSTeams
2	4th & 5th week	Power series representation of analytic functions, zeros of analytic functions, index of a closed curve	Chalk and Talk
3	**6th week**	Class Test I	
4	6th, 7th & 8th week	Cauchy's theorem and integral formula on open subsets of C. Homotopy, homotopic version of Cauchy's theorem, simple connectedness, counting of zeros, open mapping theorem.	Chalk and Talk
5	9th & 10th week	Goursat's theorem, Classification of singularities, Laurent series.	Chalk and Talk
6	11th week	Class Test II and Assignment Test	
7	11th & 12th week	Residue, Contour integration, argument principle, Rouche's theorem, Maximum principle, Schwarz' lemma.	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	Class Test II	11th week	90 minutes	30%
3	Oral Examination	11th week	20 minutes	20%
CPA	Compensation Assessment*	12th week	90 minutes	-

4	Final Assessment *	13th or 14th week	2 hours	30%

***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*431-250-3674 (*intercom no. 3674). 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

- 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
Assignment Test: A list of questions will be provided as an assignment at least a week before the test and the test will be conducted by selecting a few questions from this list.
FOR APPROVAL
Course Faculty _____ **CC- Chairperson** _____ **HOD** _____

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.