NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF CIVIL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	**M. Tech. – Structural Engineering**		
Course Title	**Stability of Structures**		
Course Code	**CE667**	**No. of Credits**	**3**
Course Code of Pre-requisite subject(s)			
Session	**July 2022**	**Section (if, applicable)**	**-**
Name of Faculty	**Dr. Kamal Krishna Bera**	**Department**	**Civil Engineering**
Email	kamal@nitt.edu	**Telephone No.**	+91 - 9301481280
Name of Course Coordinator(s) (if, applicable)	-		
E-mail	-	**Telephone No.**	
Course Type	☐ **Core course**	☑ **Elective course**	

Syllabus (approved in Senate)

Stability concept –bifurcation buckling – methods of stability analysis – energy method – initial imperfection – large displacement analysis

Buckling of columns –Euler column –second order and fourth order equation method – Rayleigh-Ritz and numerical methods – Axially loaded column – Eccentrically loaded column – inelastic buckling

Buckling of frames – braced and unbraced frames – slope deflection equations, matrix method – effective length – alignment charts

Torsional and flexural-torsional buckling – torsion of thin walled open cross-section – flexural-torsional buckling of columns – lateral-torsional buckling of beams and beam-columns

Buckling of plates – Differential equation of plate buckling – critical load on plates for various boundary conditions – Energy method – Finite difference method

COURSE OBJECTIVES

1. This course deals with stability problems in structural forms and systems.
2. It also takes care of special consideration for stability during design of structural elements.
3. It also aims for studying the buckling and analysis of structural elements.
4. To study the stability analysis problems in column, beam and beam-column.
5. To make students understand the phenomenon of buckling of frames and plates.

COURSE OUTCOMES (CO)	
Course Outcomes	**Aligned Programme Outcomes (PO)**
By the end of this course the students will be able to	
1. To understand stability of static and dynamic equilibrium.	-
2. To evaluate static stability criteria using stability equations.	-
3. To solve stability problems by energy method and finite difference method.	-
4. To predict critical loads on structures.	-
5. To create discrete and continuous models to solve stability problems.	

COURSE PLAN – PART II			
COURSE OVERVIEW			
This course deals with the stability problems in structural forms and systems e.g., column, beam, beam-column, frame, plate.			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	**Week/Contact Hours**	**Topic**	**Mode of Delivery** (for all lectures)
1	1st week – 3 hours	Stability concept, methods of analysis, stability of simple mechanical system	Offline
2	2nd week – 3 hours	initial imperfection, large displacement analysis, Buckling of columns, Euler column	
3	3nd week – 3 hours	second order and fourth order equation method, Axially loaded column	
4	4rd week – 3 hours	Eccentrically loaded column, inelastic buckling	
5	5rd week – 3 hours	beam-column	
6	6th week – 3 hours	beam-column, Buckling of frames	
7	7th week – 3 hours	Buckling of frames- matrix method	
8	8th week – 3 hours	Buckling of plates – Differential equation of plate buckling	
9	9th week – 3 hours	critical load on plates for various boundary conditions, Torsional and flexural-torsional buckling	
10	10th week – 3 hours	lateral-torsional buckling of beams and beam-columns	
11	11th week – 3 hours	Energy method	
12	12th week – 3 hours	Numerical techniques to solve stability problem	

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Quiz	5th week	30 min	15
2	Mid sem	7th week	2 hrs	30
3	Assignment	9th week	1 week	15
4	End sem	During end sem	3 hours	40

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

Feedback at the end of the semester for course evaluation as per institute norms. Feedback during classes also.

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

Apart from interactions with the students in the regular class, extra classes will be conducted if required. Students can also contact the concerned faculty member (with prior appointment) as given below:

Dr. Kamal Krishna Bera; Email: kamal@nitt.edu; Mob: +91 - 9301481280

COMPENSATION ASSESSMENT POLICY

To be decided for the students with genuine reasons.

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.**

MINIMUM PASS MARK POLICY

The Passing minimum mark: As per Institute norms.

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 programs.

FOR APPROVAL

Course Faculty **CC-Chairperson** _____ **HOD** _____