

An Autonomous Institute
Shree Warana Vibhag Shikshan Mandal's

**Tatyasaheb Kore Institute of
Engineering And Technology,
Warananagar**

NBA Accredited Institute

Department of Civil Engineering

Honor's Course in Infrastructure
Engineering 2022-2023

B. Tech. In Civil Engineering

Syllabus Structure and Curriculum under Autonomy

**Abbreviations**

Sr. No.	Acronym	Definition
1	ISE	In-Semester Examination
2	ISE-I	In-Semester Examination-I
3	ISE-II	In-Semester Examination-II
4	ESE	End Semester Examination
5	ISA	In-Semester Assessment (Term Work)
6	L	Lecture
7	T	Tutorial
8	P	Practical
9	CH	Contact Hours
10	C	Credit

Course/ Subject Categories

Sr. No.	Acronym	Definition
1	BSC	Basic Science Course
2	HSC	Humanity Science Course
3	ESC	Engineering Science Course
4	PCC	Professional Core Course
5	OEC	Open Elective Course
6	MC	Mandatory Course
7	PEC	Professional Elective Course
8	PW	Project Work (Mini and Major Project)
9	II	Industrial Internship

CO, PO & PSO Mapping Correlation:

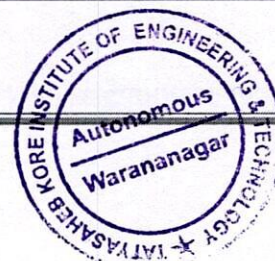
Low	Medium (Moderate)	High (Substantial)
1	2	3

Course/ Subject Code

C	E	5	0	1
Branch Code		Semester	Course Number	

Course Term work and POE Code

C	E	5	0	1	T / P / A
Branch Code		Semester	Course Number		T- Tutorial P- POE A- Audit Course





Vision

To become an academy of excellence in technical education and human resource development.

Mission

- To develop engineering graduates of high repute with professional ethics.
- To excel in academics and research through innovative techniques.
- To facilitate the employability, entrepreneurship along with social responsibility.
- To collaborate with industries and institutes of national recognition.
- To inculcate lifelong learning and respect for the environment.

Quality Policy

To promote excellence in academic and training activities by inspiring students for becoming competent professionals to cater industrial and social needs.



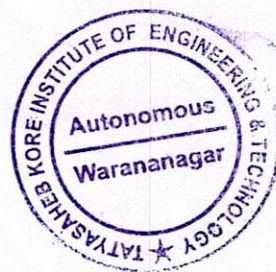


Department of Civil Engineering

Program Educational Objectives (PEO's)

After completion of program, Graduates will be able to

1	To Impart quality technical education and graduate the students for employment in civil engineering and related professions.
2	To provide students with solid foundation in mathematical and analytical subjects so as to solve civil engineering problems and also to pursue higher studies.
3	To develop the ability among the students to organize the data, synthesize data and technical concepts which will helps them to solve problems relevant to the general practice of various civil engineering disciplines
4	To inculcate with the student the expertise of using computer tools to solve problems, for presentations works, acquaint them with professional level software for planning, analysis and design purpose
5	To provide an experience in surveying work, site investigations, familiarity with the real issues of civil engineering including ethics, economy, management and emerging technologies
6	To provide an opportunity for the students to work in team by organizing various curricular and professional activities resulting in the improvement of technical and soft skills.





Department of Civil Engineering

Program Outcomes (PO's)

After completion of program, Graduates will be able to

PO1	Demonstrate knowledge in mathematics, basic sciences & civil engineering
PO2	Identify , formulate and solve civil engineering problems.
PO3	Prepare structural design such that fulfills design specification, durability, economy & safety.
PO4	Design and conduct experiment, analyze data & also interpret result to provide conclusion.
PO5	Use appropriate engineering techniques & software tools to analyze civil engineering problems.
PO6	Apply civil engineering knowledge for construction site in all respect like planning, execution and supervision.
PO7	Sensitive towards ethical, societal & environmental issue along with professional work.
PO8	Exhibit understanding of professional & ethical responsibility.
PO9	Ability to function as a leader of multidisciplinary team.
PO10	Communicate effectively in both verbal & written form.
PO11	Develop engineering research ability & project management skill.
PO12	Possess confidence for self education & ability for lifelong learning.

Program Specific Outcomes (PSO's)

After completion of program, Graduates will be able to

1	Plan and Design, Maintain and execute smart infrastructural projects.
2	Assess and analyze environmental impact of civil engineering projects and take corrective action for sustainable development.
3	Use leadership and communication abilities to optimally integrate the 4Ms Viz.- Men, Money, Material and Machine





Shree Warana Vibhag Shikshan Mandal's

Tatyasaheb Kore Institute of Engineering & Technology

Warananagar, Tal- Panhala, Dist- Kolhapur -416 113. Maharashtra



Honor's Course in Infrastructure Engineering

**Syllabus Structure under Autonomous Status of
TKIET, Warananagar**

2022-23





Third Year B. Tech. (Civil Engineering)

Semester-V

(To be implemented from 2022-23)

Credit Scheme

Course Code	Category	Course Title	Teaching Scheme					Examination & Evaluation Scheme			
			L	T	P	C	CH	Components	Marks	Min for Passing	
CE-H-501	PCC	Fundamentals of Airport Engineering	4	-	-	4	4	ESE	60	24	40
								ISE	40	16	
CE-H-501P	PCC	Fundamentals of Airport Engineering Lab	-	-	2	1	2	ISA	25	10	10
			4	-	2	5	6		125	50	-





Third Year B. Tech. (Civil Engineering)

Semester-VI (To be implemented from 2022-23) Credit Scheme

Course Code	Category	Course Title	Teaching Scheme					Examination & Evaluation Scheme			
			L	T	P	C	CH	Compon ents	Marks	Min for Passing	
CE-H-601	PCC	Rock Engineering and Tunneling	4	-	-	4	4	ESE	60	24	40
								ISE	40	16	
CE-H-601T	PCC	Rock Engineering and Tunneling Lab	-	-	2	1	2	ISA	25	10	10
			4	-	2	5	6		125	50	-



CE H-531- Fundamentals of Airport Engineering

Lectures	:	4 Hrs/Week
Credit	:	4
Tutorials	:	1

Evaluation Scheme	
ISE :	40 Marks
ESE :	60 Marks

Course Objectives: The objective of the course is to

1. To learn about the aircraft characteristics, airport planning and air traffic control
2. To study airport planning issues
3. To introduce the visual aids required from Airport Traffic Control
4. To impart knowledge of necessary inputs required for efficient drainage system

Course Outcomes (CO):

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Identify planning for an airport	Knowledge Understand
CO2	Understand the orientation of a runway	Understand
CO3	Evaluate the geometric characteristics of an airport including taxiways, aprons	Understand Evaluate
CO4	Understand drainage system	Understand
CO5	Understand the visual aids required for safe landing and takeoff operating of airport	Apply Evaluate
CO6	Understand about Heliport and STOLPORT	Understand

Description

Airport Engineering refers the design, building, and maintenance of an airport facility. Airports are designed to serve a number of roles. Key functions include providing runways for aircraft to take off and land, as well as terminals for the safe loading and unloading of passengers and cargo. An Airport Engineer should be technically sound enough to perform all the tasks coherently.

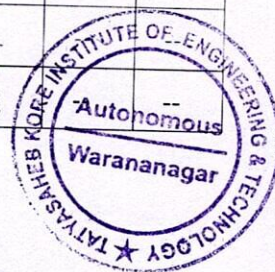
Prerequisites:	1:	Knowledge of different types of airport terminologies and aircraft characteristics
	2:	Different site selection criterion for Airport site selection
	3:	Different types of Airports and Runway properties
	4:	Various Drainage systems for Airport

Section – I**INTRODUCTION, AIRPORT SURVEYS AND PLANNING**

Unit 1	Introduction- Airport Terminologies, Components of Aeroplane, Aircraft Characteristics Airport Surveys- Objects and Types of Surveys, drawings to be prepared Airport Planning- Improvement of existing Airport, Airport site selection, Airport obstructions, Turning Zone, Zoning Laws, Regional Planning	6 Hrs
Unit 2	RUNWAY Runway Orientation, Basic Runway Length- Corrections for Elevation, Temperature and Gradient, Runway Configurations, Runway Intersection, Airport Classification, Runway Geometric Properties, Airport Capacity, Runway Patterns	6 Hrs
Unit 3	AIRPORT LAYOUT Layout of Taxiways, exit taxiways, loading aprons, holding aprons, terminal buildings aircraft hangers and parking Terminal area, planning of terminal building Apron: size of the gate position, number of gate position, aircraft parking system. Hanger: general planning considerations, blast considerations.	6 Hrs
Section – II		
Unit 4	AIRPORT DRAINAGE Aims, Functions of airport drainage, Basic Requirements of airport drainage system, surface drainage, sub-surface drainage	6 Hrs.
Unit 5	VISUAL AIDS Requirements of pilots for visual aids, Airport markings-Apron Marking, Runway Marking Taxiway Marking, Airport Lighting- Factors affecting, Elements Air Traffic Control-Flight Rules, Air traffic Control network, Air traffic Control aids	6 Hrs.
Unit 6	HELIPORT AND STOLPORT Characteristics and advantages of helicopters, Planning of Heliports, Heliports at Airports, Characteristics and Advantages of STOL aircraft, Planning of STOLPORTS	6 Hrs.

CO - PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	1	1	--	1	1	--	--	--	--	--	--	--	--	--
CO2	2	1	--	--	1	2	--	--	--	--	--	--	--	--	--
CO3	--	2	2	1	-	1	--	--	--	--	--	--	2	--	--
CO4	--	2	--	2	1	2	--	--	--	--	--	--	--	--	--
CO5	--	1	--	2	2	2	--	--	--	--	--	--	--	--	--
CO6	1	1	2	2	1	--	--	--	--	--	--	--	--	--	--
AVG	0.67	1.33	0.83	1.17	1	1.33	--	--	--	--	--	--	2	--	--



REFERENCES

Text Books	
1	Airport Engineering by G.V. Rao. Rao, Tata McGraw Hill, 1 st Edition, Publisher:K. Prakash ISBN:0074603175
2	Airport Planning & Design, by Khanna and Arora, Nemchand Bros, Roorke, Sixth Edition, Publisher: Nem Chand, ISBN:818524068X
3	Airport Engineering by S. C. Rangwala, Charotar 17th Edition 2019 (First Reprint) ISBN : 9789385039355
Reference Books	
1	Airport Engineering by Norman J. Ashford, Saleh Mumayiz, Paul H Wright, 4 th edition, ISBN : 978047039855
2	Planning & Design of Airports by Robert Horonjeff, Francis McKelvey, William Sproule, Seth Young, 2010 McGraw-Hill Education, ISBN:9780071446419
3	Principles and Practices of Highway Engineering (Including Expressways and Airport, Edition: 2017, ISBN: 9788193328439, 8193328434, Publisher: Khanna Publishers



CE H 501(T) - Fundamentals of Airport Engineering**Practicals:** 2 hrs / week**Credits:** 1**Examination Scheme:****ISA:** 25 Marks

Course Objectives: The objective of the course is to		
1. To learn about the airport planning 2. To evaluate runway length 3. To get knowledge about layout of taxiways 4. To impart knowledge of requirements for efficient drainage system		
Course Outcomes (CO):		
COs	At the end of successful completion of the practical's the student will be	Blooms Taxonomy
CO1	Able to demonstrate planning of airport	Knowledge, demonstrate
CO2	Analyze the runway length with respect to correction due to elevation, temperature	Analyze
CO3	Understand Taxiways, aprons	Analyze
CO4	Understand the fundamentals of airport drainage	Understand

TUTORIALS**A] One assignment on each unit-** Assignment should include:

Sr. No.	Practical/ Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
01	Airport planning, airport classification, types of surveys	2	Knowledge
02	Runway orientation, Correction to runway length, Airport Capacity	2	Knowledge Analyze
03	Layout of Taxiways, Loading aprons, holding aprons, terminal buildings	2	Knowledge,
04	Requirement of drainage, Surface and subsurface drainage systems	2	Knowledge
05	Airport markings, Airport lighting, Air traffic Control	2	Knowledge
06	Characteristics of helicopters, planning of helipods, STOL aircrafts	2	Knowledge,



B] One assignment on each unit with minimum five numerical in each assignment

CO - PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1	1	1	--	--	--	---	--	--	---	--	--	---	--
CO2	2	1	2	2	--	--	--	---	--	--	---	--	--	---	--
CO3	--	2	2	--	--	--	--	---	--	--	---	--	1	---	--
CO4	--	2	--	--	--	--	--	---	--	--	---	--	--	---	--

REFERENCES

Text Books	
1	Airport Engineering by G.V. Rao. Rao, Tata McGraw Hill
2	Airport Planning & Design, by Khanna and Arora, Nemchand Bros, Roorke
3	Airport Engineering by S. C. Rangwala, Charotar
Reference Books	
1	Airport Planning & Design by Khanna & Arora
2	Airport Engineering by Norman J. Ashford, Saleh Mumayiz, Paul H Wright
3	Planning & Design of Airports by Robert Horonjeff, Francis McKelvey, William Sproule, Seth Young
4	Highway Engineering including Expressways and Airport Engineering by Dr. L. R. Kadyali, Dr. N. B. Lal.



CE H 601- Rock Mechanics and Tunnelling

Lectures : 4 Hrs/Week
Credit : 4
Tutorials : 1

Evaluation Scheme

ISE : 40 Marks
ESE : 60 Marks

Course Objectives: The objective of the course is to

1. To understand of the various types of rock based on origin.
2. To study the geophysical methods and Applications of rock mechanics
3. To introduce the methods of construction of tunnel
4. To understand the tunnel lining, ventilation and lighting

Course Outcomes (CO):

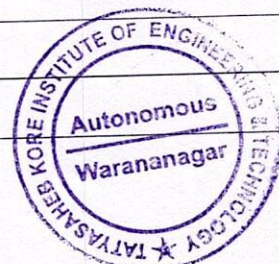
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Identify and classify types of rocks based on its origin	Remember
CO2	Understand and evaluate methods of rock exploration	Understand
CO3	Apply principles of rock mechanics to classify rock masses	Evaluate
CO4	Analyze the basic features of tunneling, including shapes, usages, construction methods, challenges, and techniques	Understand
CO5	Understand tunneling methods in soft soil and rock	Analyze
CO6	Understand about tunnel lining, ventilation and lighting	Understand

Description

The theoretical and applied science of the mechanical behavior of rock. A tunnel is an underground passageway, dug through surrounding soil, earth or rock, and enclosed except for the entrance and exit, commonly at each end.

Prerequisites:

- 1: Knowledge of classification of rock
- 2: Methods and applications of rock mechanics
- 3: Method of Tunneling
- 4: Tunnel Lining, ventilation and lighting



Section – I		
Unit 1	Introduction to Rock Mechanics	
	Objective, scope and associated problems, Discontinuities in rock, Classification of the rock based on origin	6 Hrs
Unit 2	Rock exploration	
	Methods for rock exploration: rock coring, geophysical methods, Physico-mechanical properties of rock. Laboratory testing on rock sample and in-situ testing of rock mass	6 Hrs
Unit 3	Applications	
	Rock mass classification systems, Rock and rock mass failure criteria. Applications of rock mechanics	6 Hrs
Section – II		
Unit 4	Introduction to Tunneling	
	Basic features of tunneling: shapes, usages, methods of construction, problems associated with tunnels, tunneling in various subsoil conditions and rocks.	6 Hrs.
Unit 5	Methods of Tunneling	
	Tunneling in soft soil- Method, Shield Method, Tunneling in rock- Methods, Concept of NATM, Safety Measures	6 Hrs.
Unit 6	Tunnel Lining, Drainage, ventilation & lighting	
	Tunnel Lining- Necessity, Objects, Materials Drainage of Tunnel Tunnel Ventilation and Lighting	6 Hrs.

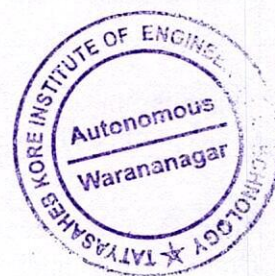
CO - PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	1	1	--	1	1	--	--	--	--	--	--	--	--	--
CO2	2	1	--	--	1	2	--	--	--	--	--	--	--	--	--
CO3	--	2	2	1	-	1	--	--	--	--	--	--	1	--	--
CO4	--	2	--	2	1	2	--	--	--	--	--	--	--	--	--
CO5	--	1	--	2	2	2	--	--	--	--	--	--	--	--	--
CO6	1	1	2	2	1	--	--	--	--	--	--	--	--	--	--
AVG	0.67	1.33	0.83	1.17	1	1.33	--	--	--	--	--	--	1	--	--



REFERENCES

Text Books	
1	Goodman R. E. Introduction to rock mechanics. Ed.2, Wiley, 1989
2	Deb D., and Verma A. K. Fundamentals and applications of rock mechanics. PHI Learning Pvt. Ltd., 2016
3	R Srinivasan, Tunnel Engineering, Charotar Publishing House Pvt. Ltd.
Reference Books	
1	Jaeger J. C., Cook N. G. W., and Zimmerman R. W. Fundamentals of rock mechanics. Ed. 4, Wiley Blackwell, 2007
2	Ramamurthy T. (Editor). Engineering in rocks for slopes, foundations and tunnels. Ed. 3, PHI Learning Pvt. Ltd., 2015.



CE H 601 (T)- Rock Mechanics and Tunnelling

Practical: 2 hrs / week

Credits: 1

Examination Scheme:

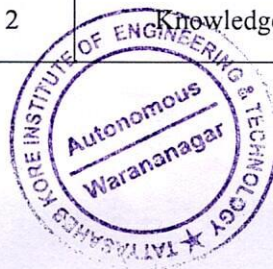
ISA: 25 Marks

Course Objectives: The objective of the course is to		
1. To understand of the various types of rock based on origin. 2. To study the geophysical methods and Applications of rock mechanics 3. To introduce the methods of construction of tunnel 4. To understand the tunnel lining, ventilation and lighting		
Course Outcomes (CO):		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Identify and classify types of rocks based on its origin	Remember Understand
CO2	Understand and evaluate methods of rock exploration	Understand Evaluate
CO3	Apply principles of rock mechanics to classify rock masses	Understand Apply
CO4	Analyze the basic features of tunneling, including shapes, usages, construction methods, challenges, and techniques	Understand Analyze
CO5	Understand tunneling methods in soft soil and rock	Understand
CO6	Understand about tunnel lining, ventilation and lighting	Understand

TUTORIALS

A] One assignment on each unit- Assignment should include:

Sr. No.	Practical/ Experiment/Tutorial Topic	Hrs.	Bloom's Taxonomy
01	Introduction to Rock Mechanics	2	Knowledge
02	Rock exploration	2	Knowledge



03	Applications	2	Knowledge
04	Introduction to Tunneling	2	Knowledge
05	Methods of Tunneling	2	Knowledge
06	Tunnel Lining, Drainage, ventilation & lighting	2	Understand

CO - PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	1	1	--	1	1	--	--	--	--	--	--	--	--	--
CO2	2	1	--	--	1	2	--	--	--	--	--	--	--	--	--
CO3	--	2	2	1	-	1	--	--	--	--	--	--	1	--	--
CO4	--	2	--	2	1	2	--	--	--	--	--	--	--	--	--

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2	Deb D., and Verma A. K. Fundamentals and applications of rock mechanics. PHI Learning Pvt. Ltd., 2016
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