

Academic Course Description

<p>BHARATH UNIVERSITY Faculty of Engineering and Technology Department of Civil Engineering</p> <p>BCE305 Engineering Earth Science Third Semester, 2017-18 (Odd Semester)</p>

Course (catalog) description

To understand the importance of geological knowledge such as earth, earthquake and to apply this knowledge in projects such as dams, tunnels, bridges, roads, airports and harbor as well as to choose type of foundation. Graduates will be capable of utilizing their backgrounds in engineering and earth science to provide solution to engineering problems within the context of the natural world. Areas of geological engineering practice might including fluid flow and contaminant transport in the subsurface.

Compulsory/Elective course : Compulsory for Civil students

Credit / Contact hours : 3 credits / 45 hours

Course Coordinator : Dr.S.Buvaneshwari Professor

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Mr.S.Vinothkumar	Second Year	Civil Block			9.00 - 9.50 AM
Dr.S.Buvaneshwari	Second Year	Civil Block			12.45 - 1.15 PM

Relationship to other courses:

Pre –requisites : +2 level science

Assumed knowledge : Basic knowledge Geological knowledge

Following courses : Nil

Syllabus Contents

UNIT I GENERAL GEOLOGY

9 Hours

Geology in Civil Engineering - Branches of geology - Earth Structure and Composition - Elementary knowledge on continental drift and plate tectonics. Earth processes - Weathering - Work of rivers, wind and sea and their engineering importance – origin, occurrence of earthquake- Mode of occurrence - prospecting –Ground water - Importance in civil engineering.

UNIT II MINERALOGY

9 Hours

Elementary knowledge on symmetry elements of crystallographic systems - physical properties of minerals - study of the following rock forming minerals - Quartz family. Feldspar family, Augite, Hornblende, Biotite, Muscovite, Calcite, Garnet - properties, process of formation of all minerals - Coal and Petroleum - Their origin and occurrence in India.

UNIT III PETROLOGY

9 Hours

Classification of rocks - Distinction between Igneous, Sedimentary and Metamorphic rocks. Description – occurrence, properties and distribution of following rocks. Igneous rocks - Granite, Syenite, Diorite, Gabbro, Pegmatite, Dolerite and Basalt. Sedimentary rocks - sandstone, Limestone, Shale, Conglomerate and breccia. Metamorphic rocks - Quartzite, Marble, Slate, Gniess and Schist.

UNIT IV STRUCTURAL GEOLOGY AND ROCK MECHANICS**9 Hours**

Attitude of beds - Outcrops - Geological maps - study of structures - Folds, Faults and Joints - Their bearing on Engineering Construction -Rock mechanics - physical properties and mechanical properties of rocks – porosity – permeability - density – strength – hardness – elasticity – plasticity - dynamic property of rocks - types of wave theory – factors influencing wave velocity - static and dynamics moduli of elasticity – grouting.

UNIT V GEOLOGICAL AND GEOPHYSICAL INVESTIGATION IN CIVIL ENGINEERING**9 Hours**

Site investigations - Geological methods - Exploration techniques - geophysical methods – Seismic and electrical methods – direct penetration – core boring – logging of cores – geological condition necessary for construction of dams – tunnels – building – Road cutting

TEXT BOOKS:

1. Parbin Singh, "Engineering and General Geology ", Katson Publication House.
2. P. C. Varghese, "Engineering Geology for Civil Engineers". PHI Learning Pvt. Ltd.,

REFERENCES:

1. Legeet, " Geology and Engineering ", McGraw Hill Book Company, 1998.
2. Blyth, " Geology for Engineers ", ELBS, 1995.

Computer usage: Nil**Professional component**

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

Broad area : Building Construction**Test Schedule**

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1 st week	Session 1 to 14	2 Periods
2	Cycle Test-2	September 2 nd week	Session 15 to 28	2 Periods
3	Model Test	October 2 nd week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

	Correlates to program outcome		
	H	M	L
1. To understand the role of geology in the design and construction process of underground openings in rock	a,d,f,g	i	
2. Be able to apply geologic concepts and approaches on rock engineering projects.	a,d,f,g	i	
3. Be able to identify and classify rock using basic geologic classification systems.	a,d,f,g	i	
4. Be able to use the geologic literature to establish the geotechnical framework needed to properly design and construct heavy civil works rock projects.	a,d,f,g	i	
5. To assign projects which test student knowledge and application of intact rock and rock mass properties in geotechnical engineering	a,d,f,g	i	

Draft Lecture Schedule

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I GENERAL GEOLOGY			
1.	Geology in Civil Engineering - Branches of geology	NO	Text 1
2.	Earth Structure and Composition	NO	
3.	Elementary knowledge on continental drift and plate tectonics	NO	
4.	Earth processes	NO	
5.	Weathering - Work of rivers	NO	
6.	Wind and sea and their engineering importance	NO	
7.	origin, occurrence of earthquake	NO	
8.	Mode of occurrence, prospecting	NO	
9.	Ground water, Importance in civil engineering.	NO	
UNIT II MINERALOGY			
10.	Elementary knowledge on symmetry elements of crystallographic systems	NO	Text 1
11.	Physical properties of minerals	NO	
12.	Study of the following rock forming minerals	NO	
13.	Quartz family, Feldspar family	NO	
14.	Augite, Hornblende, Biotite,	NO	
15.	Muscovite, Calcite, Garnet	NO	
16.	properties, process of formation of all minerals	NO	
17.	Coal and Petroleum	NO	
18.	Their origin and occurrence in India	NO	
UNIT III PETROLOGY			
19.	Classification of rocks	NO	Text 1
20.	Distinction between Igneous, Sedimentary and Metamorphic rocks	NO	
21.	Description occurrence	NO	
22.	Properties and distribution of Igneous rocks - Granite, Syenite	NO	
23.	Igneous rocks Diorite, Gabbro, Pegmatite, Dolerite and Basalt	NO	
24.	Sedimentary rocks - sandstone, Limestone,	NO	
25.	Sedimentary rocks -Shale, Conglomerate and breccia	NO	
26.	Metamorphic rocks - Quartzite, Marble,	NO	
27.	Metamorphic rocks-Slate, Gniess and Schist	NO	
UNIT IV STRUCTURAL GEOLOGY AND ROCK MECHANICS			
28.	Attitude of beds - Outcrops	NO	Text 1
29.	Geological maps - study of structures	NO	
30.	Folds, Faults and Joints	NO	
31.	Their bearing on Engineering Construction	NO	
32.	Rock mechanics, physical properties and mechanical properties of rocks	NO	
33.	Porosity, permeability ,density ,strength ,hardness ,elasticity ,plasticity	NO	
34.	Dynamic property of rocks - types of wave theory	NO	
35.	Factors influencing wave velocity	NO	
36.	static and dynamics moduli of elasticity, grouting.	NO	
UNIT V GEOLOGICAL AND GEOPHYSICAL INVESTIGATION IN CIVIL ENGINEERING			
37.	Site investigations - Geological methods	NO	

38.	Exploration techniques	NO	Text 1
39.	geophysical methods	NO	
40.	Seismic and electrical methods	NO	
41.	Direct penetration ,core boring	NO	
42.	Logging of cores	NO	
43.	Geological condition necessary for construction of dams	NO	
44.	Geological condition necessary for construction of tunnels – building	NO	
45.	Geological condition necessary for construction of Road cutting	NO	

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	5%
Assignment	-	5%
Attendance	-	10%
Final exam	-	70%

Prepared by: Mr.S.Vinothkumar Assistant Professor , Department of Civil

Dated :

Addendum

ABET Outcomes expected of graduates of B.Tech / Civil / program by the time that they graduate:

- a. An ability to apply knowledge of mathematics, science, and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate, and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Educational Objectives

PEO1: PREPARATION

Civil Engineering graduates will have knowledge to apply the fundamental principles for a successful profession and/or for higher education in Civil Engineering based on mathematical, scientific and engineering principles, to solve realistic and field problems that arise in engineering and non engineering sectors

PEO2: CORE COMPETENCE

Civil Engineering graduates will adapt to the modern engineering tools and construction methods for planning, design, execution and maintenance of works with sustainable development in their profession.

PEO3: PROFESSIONALISM

Civil Engineering Graduates will exhibit professionalism, ethical attitude, communication and managerial skills, successful team work in various private and government organizations both at the national and international level in their profession and adapt to current trends with lifelong learning.

PEO4: SKILL

Civil Engineering graduates will be trained for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS

Civil Engineering graduates will be installed with ethical feeling, encouraged to make decisions that are safe and environmentally-responsible and also innovative for societal improvement.

Course Teacher	Signature
Mr.S.Vinothkumar	
Dr.S.Buvaneshwari	

Course Coordinator

HOD/Civil