Department of Earth and Atmospheric Sciences

B.Sc., Geology - 2018 Regulations

Curriculum & Syllabus

SEMESTER I						
S.NO	**SUBJECT**	**TITLE OF THE SUBJECT**	**L**	**T**	**P**	**C**
1.	HBTA17001	Tamil/Hindi/French-I	3	0	0	3
2.	HBEN17001	English-I	3	0	0	3
3.	HBPH17A01	Allied Paper I Physics I	4	0	0	4
4.	HBGE18001	General Geology	4	0	0	4
5.	HBGE18002	Crystallography	3	1	0	4
6.	HBGE18L01	Crystallography and General Geology Lab	0	0	3	2
		Total	**17**	**1**	**3**	**20**

SEMESTER II						
S.NO	**SUBJECT**	**TITLE OF THE SUBJECT**	**L**	**T**	**P**	**C**
1.	HBTA17002	Tamil/Hindi/French-II	3	0	0	3
2.	HBEN17002	English-II	3	0	0	3
3.	HBMA18A05	Allied Paper II Basics of Mathematics and	3	1	0	4
4.	HBPH17A02	Allied Paper III Physics II	4	0	0	4
5.	HBGE18003	Mineralogy	3	1	0	4
6.	HBGE18L02	Professional Skills I Mineralogy lab	0	0	3	2
7.	HBPH17AL1	Allied Lab I Physics lab	0	0	3	2
		Total	**16**	**2**	**6**	**22**

SEMESTER III						
S.NO	**SUBJECT**	**TITLE OF THE SUBJECT**	**L**	**T**	**P**	**C**
1.	HBCH18A03	Allied Paper IV Chemistry	4	0	0	4
2.	HBGE18004	Environmental Geology	3	0	0	3
3.	HBGE18005	Geomorphology	3	0	0	3
4.	HBGE18006	Palaeontology	3	1	0	4
5.	HBMG17L01	Soft Skills I	0	1	1	2
6.	HBCH18AL1	Allied Lab II Chemistry lab	0	0	3	2
7.	HBGE18L03	Palaeontology Lab	0	0	3	2
		Total	**13**	**2**	**7**	**20**

Department of Earth and Atmospheric Sciences

SEMESTER IV						
S.NO	**SUBJECT**	**TITLE OF THE SUBJECT**	**L**	**T**	**P**	**C**
1.	HBGE18007	Igneous and Metamorphic Petrology	3	1	0	4
2.	HBGE18008	Structural Geology and Sedimentary Petrology	3	1	0	4
3.	HBGE18009	Surveying	3	1	0	4
4.	HBGE18010	Disaster Mitigation and Management	3	0	0	3
5.	HBMG17L02	Soft Skills II	0	1	1	2
6.	HBGE18L04	Petrology Lab	0	0	3	2
7.	HBGE18L05	Structural geology and Survey Lab	0	0	3	2
		Total	**12**	**4**	**7**	**21**

SEMESTER V						
S.NO	**SUBJECT**	**TITLE OF THE SUBJECT**	**L**	**T**	**P**	**C**
1.	HBGE18011	Stratigraphy and Indian Geology	4	0	0	4
2.	HBGE18012	Economic geology	3	1	0	4
3.	HBGE18013	Hydrogeology	3	1	0	4
4.	HBGE18014	Applied geology	4	0	0	4
5.	HBGE18015	Soil mechanics	3	1	0	4
6.	HBGE18L06	Field geology	0	0	3	2
7.	HBGE18L07	Soil lab	0	0	3	2
		Total	**17**	**3**	**6**	**24**

SEMESTER VI						
S.NO	**SUBJECT**	**TITLE OF THE SUBJECT**	**L**	**T**	**P**	**C**
1.	HBMG17G01	Entrepreneurial Development	3	0	0	3
2.	HBGE18016	Remote sensing and GIS	3	1	0	4
3.	HBGE18017	Mining Geology	3	1	0	4
4.	HBGE18L08	Professional Skills II Remote sensing and GIS Lab	0	0	3	2
5.	HBGE18L09	Field Geology and Project Work	0	0	20	10
		Total	**9**	**2**	**23**	**23**

SUMMARY OF CREDITS

I Semester : 20
II Semester : 22
III Semester : 20
IV Semester : 21
V Semester : 24
VI Semester : 23

TOTAL : 130

Department of Earth and Atmospheric Sciences

Credit Tally (Year wise)	
I Year (I & II Sem) - 20+22	42
II Year (III & IV Sem) - 20+21	41
III Year (V & VI Sem) - 24+23	47
Total	**130**

Credit Tally (Semester wise)	
I Semester	20
II Semester	22
III Semester	20
IV Semester	21
V Semester	24
VI Semester	23
TOTAL	**130**

Common Courses Credits			
Language 1	3+3	6	
Language 2	3+3	6	
Allied	4*4	16	
Allied Lab	2	4	
Soft skill 1 & 2	2*2	4	
ED, Disaster management	3+3	6	
Project		10	
Total		**52**	**credits**
Dept to distribute (14 theory *4 + 2 theory *3+8 labs *2)		78	credits
Total		**130**	**credits**

Department of Earth and Atmospheric Sciences

Dr.M.G.R
EDUCATIONAL & RESEARCH INSTITUTE
UNIVERSITY
(Declared U/S 3 of the UGC Act 1956)
B.B.A., BCA., B.Sc., B.Com முதல் பருவம்

நோக்கம்:

- வாய்மொழி இலக்கியத்தையும் செய்யுள் இலக்கியத்தையும் அறிந்து கொள்ளல்
- சிறுகதை மரபினைப்புரிந்து கொள்ளல்
- பிழைஇன்றித்தமிழ் எழுதுவதற்கு அடிப்படை இலக்கணத்தைப்பயிற்றுவித்தல்
- கவிதை மரபினையும் சிறுகதை மரபினையும் வரலாற்று நிலையிலிருந்து விளக்குதல்

தமிழ் - தாள் I

அலகு – 1

1. தாலாட்டு
2. காதல்
3. ஒப்பாரி
4. காணிநிலம் வேண்டும் - பாரதி
5. நல்லதோர் வீணை – பாரதி
6. தமிழ்க்காதல் - பாரதிதாசன்
7. தமிழ்வளர்ச்சி – பாரதிதாசன்
8. எந்நாளோ? – பாரதிதாசன்
9. ஆறு தன் வரலாறு கூறுதல் - கவிமணி தேசிய விநாயகம் பிள்ளை

அலகு – 2

1. வழித்துணை – ந.பிச்சமூர்த்தி
2. குருடர்களின் யானை – அப்துல்ரகுமான்
3. முள் முள் முள் - சிற்பி

துணை வேந்தர் அவர்களுக்கு அனுப்பப்படுகிறது.

Prof. Dr. S. DINAKARAN
JOINT REGISTRAR
Dr. M.G.R.
Educational and Research Institute
University
(Decl. u/s.3 of UGC Act, 1956)
Periyar E.V.R. High Road
Maduravoyal, Chennai-600 095

அலகு -3 புதுமைப்பித்தன் கதைகள்

1. கடவுளும் கந்தசாமிப் பிள்ளையும்
2. செல்லம்மாள்
3. துன்பக்கேணி
4. ஆற்றங்கரைப் பிள்ளையார்
5. ஒருநாள் கழிந்தது

அலகு -4

1. பெயர், வினை, இடை, உரிச்சொற்களின் பொது இலக்கணம், வலிமிகும் இடங்கள், வலிமிகா இடங்கள்.

அலகு – 5

1. தமிழ்க் கவிதையின் தோற்றமும் வளர்ச்சியும் (மரபுக்கவிதை, புதுக்கவிதை)
2. தமிழ்ச்சிறுகதையின் தோற்றமும் வளர்ச்சியும்

மரபுத் தொடர்கள், பொருந்தியசொல் தருதல் கலைச் சொற்கள், நோக்காணல்

மேற்பார்வை நூல்கள்:

Vice Chancellor
Dr. M.G.R. சென்னைப் பல்கலைக்கழக வெளியீடு – 2013
EDUCATIONAL AND RESEARCH INSTITUTE
UNIVERSITY
(Declared u/s 3 of the UGC Act 1956)
Periyar E.V.R. Road,

2. பொருந்தியசொல் தருதல் கலைச் சொற்கள், நோக்காணல்

தமிழ்த்துறைத் தலைவர்
டாக்டர் எம்.ஜி.ஆர்.
கல்வி மற்றும் ஆராய்ச்சி நிறுவனம்
பல்கலைக்கழகம்
மதுரவாயல், சென்னை-600 095

(1)

HBEN17001	FRENCH-1	L T P C 3 0 0 3

UNIT I **9Hrs**

Decouvrir la langue francaise

- Se presenter,dire si on comprend,presenter une personne,nommer les choses,savoir vivre,coprendre la grammaire

UNIT II **9Hrs**

Faire connaissance

- Donner des informations sur une personne,demander,exprimer ses preferences,parler de son travail,parler de ses activites,parler de son pays,de sa ville

UNIT III **9Hrs**

Organiser son temps

- Dire la date,dire l'heure,donner des informations sur un employ du temps,proposer-accepter-refuser,interroger-repondre,faire un programme d'activitites

UNIT IV **9Hrs**

Decouvrir son environnement

- S'orienter,situer,Se Loger,Exprimer la poession,Connalture les rythmes de vie, Fixer des regles

UNIT-V **9Hrs**

S'informer

- Dire ce qu'on fait,S'informer sur un employ du temps passé, Expliquer,Exprimer la doute ou la certitude,Decouvrir les relations entre les mots,Savoir s'informer

Total no of hours: 45

REFERENCES:

Campus 1-methode de francaise by Jacky Girardet,Jacques Pecheur.

Department of Earth and Atmospheric Sciences

HBTA17001	HINDI- I	L T P C 3 0 0 3

UNIT I **9Hrs**

1. Sabhyata kaa rahasya-lesson and annotations, questions and answers
2. Administrative terms(Prayojan mulak Hindi)

UNIT II **9Hrs**

1. Mitratha ka rahasya- lesson and annotations, questions and answers
2. Patra lekham,definitions,correspondence in hindi

UNIT III **9Hrs**

1. Paramanu oorja evam and kadhya sanrakshan(lesson) annotations and answers
2. Technical terms and words, letter writing

UNIT IV **9Hrs**

1. Yuvavon se (lesson), annotations, essay, questions and answers
2. Types of official correspondence, technical terms
3. Grammer (Change of voice, correcting the sentences)

UNIT V **9Hrs**

1. Yogyata aur vyavasay ka chunav(lesson) essay, questions and answers
2. Letter writing
3. Grammar & Technical terms

Total no of hours: 45

REFERENCES:

1. *Dr.Syed Rahmatullah & Poornima Prakshan, Hindi gadhya maala*
2. *Dr.Syed Rahmatullah & Poornima Prakshan, Prayojanmulak hindi*
3. *Dakshin Bharat Hindi Prachara Sabha,T.Nagar, Saral Hindi Vyakaran-2*

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HBEN17001	ENGLISH I	L T P C 3 0 0 3

UNIT I

Prose: Literary Melodies (Orient Black Swan)

UNIT II

Poetry: Literary Melodies (Orient Black Swan)

UNIT III

Short Stories: Literary Melodies (Orient Black Swan)

UNIT IV

One Act Plays: Literary Melodies (Orient Black Swan)

UNIT V

Functional English

Total: **45 Periods**

SEMESTER I

From the Academic Year 2017-2018

COURSE OBJECTIVES:

1. to prepare students for attaining a comprehensive knowledge of the communication skills

2. to make them understand the nuances of the language and use its vocabulary in appropriate contexts

3. to develop in students a knowledge of the various techniques in language use

4. to develop in them analytical and interpretative skills

5. to train learners in organized academic and business writing

Unit I-PROSE- For Detailed Study

1. On Running After One's Hat — G.K. Chesterton
2. The Unexpected — Robert Lynd
3. How to be a Doctor — Stephen Leacock

Unit II- POETRY- For Detailed Study

1. Ulysses — Lord Tennyson
2. If — Rudyard Kipling
3. Leave this Chanting and Singing — Rabindranath Tagore

Unit III- SHORT STORY

1. A Retrieved Reformation — O'Henry

2. Engine Trouble R.K. Narayan

Unit IV – GLIMPSES FROM GREAT MINDS

1. I lived with words R.L. Stevenson
2. My Vision for India Dr. APJ Abdul Kalam

Unit V - FUNCTIONAL ENGLISH

Enhancing LSRW Skills through Tasks

Note: Each lesson to be followed by text-based Vocabulary, Grammar, and Usage Exercises

Synonyms, Antonyms- Affixes (prefixes & Suffixes)-Noun- Adjectives, Verb,Tense, Adverb, Preposition, 'if' clause, Articles, discourse markers, Reported and Direct speech- Voice, Degrees of comparison, Interrogatives

Comprehension, Précis writing

COURSE LEARNING OUTCOME:

Students completing the General English course

1. will be able to attain comprehensive knowledge of the four skills of communication viz.LSRW
2. will be able to understand the nuances of English Language as use its vocabulary in appropriate contexts
3. will have acquired the knowledge of the various techniques in language usage
4. will have acquired proficiency in analytical and interpretative skills
5. will be trained in organized and academic and business writing

Text Prescribed: Pushkala R, Padmasani Kannan, Chandrasena Rajeswaran, Anuradha V **Literary Melodies,** Orient Black Swan, 2017

Text Books, Reference Books and Web Resources

1. *Pushkala R, P.A.Sarada, El Dorado: A Textbook of Communication Skills, Orient Blackswan, 2014*
2. *Padmasani Kannan.S., Pushkala.R. : Functional English*
3. *Hancock, Mark, English Pronunciation in Use; Cambridge Univ. Press, 2013*
4. *McCarthy, Michael et.al,, English Vocabulary in Use, Advanced, Cambridge Univ. Press, 2011*
5. *Wren and Martin: Grammar and Composition, Chand & Co, 2006*
6. *Part I& Part II from Spring Board by Orient Black Swan Pvt. Ltd.*
7. *http:// learenenglish. Britishcouncil.org*
8. *www.englishpage.com*
9. *www.writingcentre.uottawa.ca/hypergrammar/preposit.html*
10. *www.better-english.com/grammar/preposition.html*
11. *http://www.e-grammar.org/infinitive-gerund/*
12. *www.idiomsite.com/*

Department of Earth and Atmospheric Sciences

HBPH17A01	ALLIED PAPER I PHYSICS - I	L T P C 4 0 0 4

UNIT I HEAT AND SOUND 12hrs

Conduction of heat – Thermal Conductivity – Thermal Conductivity of bad conductor – Lee's Disc Method – Radial Flow of Heat – Thermal Conductivity of Glass and Rubber. Ultrasonics - Production of Ultrasonics – Piezo electric method – Magnetostriction method – Properties – Applications.

UNIT II FIBRE OPTICS AND LASER 12hrs

Fibre optics – Introduction- Total internal reflection – Acceptance Angle and Numerical Aperture- Classification of Optical Fibres – step index and Graded index Fibre – Optical Fibre Communication. Laser: Spontaneous and Stimulated emission- population Inversion – He-Ne Laser, CO_2, Laser- Semiconductor Laser – Applications.

UNIT III MAGNETISM 12hrs

Basic Concepts of magnetic materials – magnetic properties of Dia , Para and ferro magnetic materials – Area of (B-H) loop – Electric and Magnetic circuits – Curie Temperature – application of Ferrites in computer memory.

UNIT-IV D.C AND A.C CIRCUITS 12hrs

DC Circuits: Introduction to electrical circuits, Ohm's law , Kirchoff's law, method of solving a circuits by Kirchoff's laws , series and parallel connections –problems.AC Circuits : Peak, Average and RmS values of ac current and voltage – LR Circuits , CR circuits , LCR circuits , Resonance frequency – power factor and Current values in an ac circuit.

UNIT-V NANO MATERIALS AND NDT 12hrs

Nanomaterials : Definition- Classification – properties – types of synthesis method- Sol-gel method – Gas Condensation method – Chemical method – their Applications .Non-Destructive method: Definition- liquid penetrant method – Ultrasonic flow detection Method- Applications.

Total no of hours: 60

TEXT BOOKS:

1. Allied Physics –Dr.K. Thangaraj and Dr. D.Jeyaraman- Popular book depot.
2. Applied Physics for Engineering – Dr.V. Rajendran & Dr. A.Marikani-Tata McGraw Hill.
3. Electricity and Magnetism by N.S. Khare and S.S. Srivastava , Atma Raam & Sons, 10th Editon , New Delhi(1983)

REFERENCES:

1. *Fundamentals of Physics by Resnick & Halliday*
2. *Engineering Physics -1 By Dr. D.Jeyaraman*
3. *Material Science by Dr.M. Arumugam- Anuratha Publications*

Department of Earth and Atmospheric Sciences

HBGE18001	GENERAL GEOLOGY	L T P C 4 0 0 4

OBJECTIVE

To learn about the basic principles of Geology, Evolution of the Solar system, causes and effects of Earthquakes, Mass movements like Soil creep, Rock Creep and Solifluction, Earth's various exogenetic processes like weathering and action of geological agents and Endogenetic processes like earthquake, volcanoes, tectonic process and mountains.

UNIT I INTRODUCTION 12 hrs

Definition of Geology – Branches of Geology – The Solar system: – The Planets– Meteorites – Asteroids –Satellites – Comets. Evolution of the Solar system –Nebular hypothesis – Planetesimal hypothesis – Tidal hypothesis – Jean Jeffrey's hypothesis - Dust Cloud hypothesis - Big bang theory. The age of the earth – sedimentation method - salinity method – Kelvin's rate of cooling method – Dating Methods: Radiometric methods- Uranium-lead, Thorium – Lead, Potassium – Argon and C14 methods.

UNIT II STRUCTURE AND COMPOSITION 12 hrs

Detailed study of the structure and composition of Earth's interior. Earthquakes: Definition – causes and effects – Focus and Epicenter –Magnitude and Intensity – Properties and propagation of seismic waves–Seismograph and Seismogram – Distribution of Earthquakes –Prediction of Earthquakes – Earthquakes in India – Tsunami.

UNIT III VOLCANISM AND MASS MOVEMENT 12 hrs

Volcanoes: Definition – Types, Phases – Solid, Liquids and Gaseous Products, Distribution of volcanoes, Causes of volcanism – Effects of Volcanic activity -Prediction of volcanoes. Mass movements – Definition – Classification –Slow movements: Soil creep, Rock creep and solifluction. Rapid movements: Earth flows, rock falls and landslides. Causes of landslides.

UNIT IV BASIC GEODYNAMICS 12 hrs

Distribution of continents and oceans –Characters of continents and Oceans –Continental margin – Ocean basin; Continental drift: Wegner's and Taylor's hypothesis; Sea floor spreading: Concept of plate tectonics – Different types of plate margins – Evidences in favor and against the concepts of Continental Drift and Plate Tectonics; Introduction to Mid Oceanic Ridges, Submarine trenches and Transform faults.

UNIT V OROGENY 12 hrs

Mountains: Classification – Life cycle of mountains – Origin of mountains. Geosynclines. Types of plateaus and plains. Causes, effects and evidences of Sea level changes.

Total no of hours: 60

TEXT BOOKS:

1. Arthur Holmes (1992) Principles of Physical Geology: Thomas Nelson & sons London.
2. Philip G. Worcester (1939) A textbook of geomorphology: D. Van Nostrand co., London.
3. Radhakrishanan. V (1966).General Geology - V.V.P. Press.
4. Patwardhan, A.M. (2012) The Dynamic Earth System - PHI Learning PVT. Ltd, New Delhi

REFERENCES:

1. *William J. Miller (1949) -Principles of physical Geology - Thomas Nelson & sons , London.*
2. *W. D. Thornbury (1969) A text book of geomorphology - D. Van Nostr and co., London.*
3. *L.D. Leet& Judson (1960) Physical Geology - Prentice Hall, India.*
4. *Edger W. SpencerEarth Science(2002) -Mc Graw Hill, New Delhi.*

Department of Earth and Atmospheric Sciences

HBGE18002	CRYSTALLOGRAPHY	L T P C 3 1 0 4

UNIT I INTRODUCTION 12 hrs

Definition of crystal – morphological characters of crystal – faces –forms – edges solid angles Interfacial angle. Contact Goniameter and its use. Symmetry elements – crystallographic axes – crystal notation – parameter system of Weiss and Miller indices – axial ratio – laws of crystallography – the law of constancy of symmetry , the law of constancy of interfacial angles and the law of rational indices. Classification of crystals into systems and classes - Holohedral , Hemihedral, Hemimorphic and Enantiomorphic forms in crystals.

UNIT II CRYSTALLOGRAPHIC SYSTEMS 12 hrs

Elementary knowledge of spherical and stereographic projections. study of the symmetry elements, and forms of the Normal, pyritohedral , tetrahedral and plagiohedral classes of cubic system with special reference to well developed crystals of Galena, Spinel, Garnet, Flourite, Diamond, Pyrite, Tetrahedrite, Boracite and cuprite.

UNIT III SYMMETRY ELEMENTS AND FORMS OF NORMAL AND TETRAGONAL SYSTEM OF MINERALS 12 hrs

Study of symmetry elements and forms of Normal, Hemimorphic, Tripyramidal, Pyramidal Hemimorphic, Sphenoidal and Trapezohedral classes of Tetragonal system with special reference to well developed crystals of zircon, Rutile, Cassiterite, Vesuvianite, Apophyllite, Sheelite, Meionite, Wulfenite and Chalcopyrite.

UNIT IV SYMMETRY ELEMENTS AND FORMS OF HEXAGONAL AND ORTHORHOMBIC SYSTEM OF MINERALS 12 hrs

Study of the symmetry elements and forms of Normal, Hemimorphic, Tripyramidal, Pyramidal hemimorphic, Trapezohedral, Rhombohedral, Rhombohedral Hemimorphic, Trirhombohedral and Trapezohedral classes of Hexagonal system with special reference to well developed crystals of Beryl ,Zincite, Apatite, Calcite, Corundum, Tourmaline, Phenacite and Quartz. Study of the symmetry elements and forms of the Normal , Hemimorphic and Sphenoidal classes of Orthorhombic system with special reference to well developed crystals of Barite, olivine topaz, staurolite, Sulphur, Calamine, Struvite and Epsomite.

UNIT V SYMMETRY ELEMENTS AND FORMS OF MONOCLINIC AND TRICLINIC MINERALS 12 hrs

Study of the symmetry elements and forms of the Normal classes of the Monoclinic andTriclinic systems with special reference to well developed crystals of Gypsum, Orthoclase, Albite, Augite, Axinite and Kyanite. Twin crystals – Definitions – Effects of Twinning – laws of twinning – composition plane, twinning plane and twinning axis, indices of twins – simple and repeated (polysynthetic twins), contact and penetration twins: secondary twins. Study of twin laws pertaining to the following crystals – Flourite (spinel law), Pyrite (iron cross twin). Rutile (geniculate), Calcite, Quartz (Brazil laws), Aragonite (mimetic twin), Staurolite (cruciform), Gypsum, Augite and Feldspars (Carlsbad, Baveno ,Manebach, Albite and Pericline).

Total no of hours: 60

TEXT BOOK:

1. Dana, E.S. (1955). A text book of Mineralogy. John Wiley and Sons

REFERENCES:

1. *Phillips .P.C (1956) - An Introduction to crystallography-Longmans Green and Co.*
2. *Hurbut, C.S., Dana's manual of Mineralogy.*

HBGE18L01	CRYSTALLOGRAPHY AND GENERAL GEOLOGY LAB	L T P C 0 0 3 2

CRYSTAL MODELS:

IDENTIFICATION AND DESCRIPTION OF THE FOLLOWING CRYSTAL MODELS:
Galena, Garnet, Fluorite, Pyrite, Tetrahedrite,Boracite, Sphalerite, Cuprite Zircon, Cassiterite, Rutile,Octahedrite, Apophyllite, Vesuvianite, Scheelite,Meonite, Wulfenite, Chalcopyrite, Beryl, Zincite, Apatite, Calcite, Haematite,Dolomite, Corundum, Tourmaline, Phenacite, Dioptase, Quartz, Olivine,Topaz, Barite, Andalusite, Cordierite, Sulphur, Staurolite, Hypersthene,Calamine, Struvite, Epsomite, Gypsum, Orthoclase, Augite, Hornblende,Epidote, Sphene, Axinite, Albite, Kyanite and Rhodonite.

SIMPLE TWIN MODELS:
Galena, Fluorite, Pyrite, Rutile, Calcite, Quartz, Staurolite, Gypsum,Augite,Orthoclase,Albite.

GEOMORPHOLOGY:
Reading of topographic maps. Scheme of numbering of topographic maps. Data provided on topographic maps. Drainage patterns and their relationship to lithology and structure. Computation of gradient of a stream. Contour patterns related to different topographic forms such as valleys, ridges (mesa, cuesta, homoclinal ridge, hogback), scarps, domes, basins, waterfalls, slopes, plains, gorges, plateaus, sand dunes. Contour patterns related to structures such as horizontal, dipping and folded beds, plunging folds. Contour patterns of igneous, sedimentary and metamorphic rocks

Total no of hours: 30

REFERENCES:

1. *Duff, P. M. D., & Duff, D. (Eds.). (1993). Holmes' principles of physical geology. Taylor & Francis.*
2. *Emiliani, C. (1992). Planet earth: cosmology, geology, and the evolution of life and environment.*
   Cambridge University Press.
3. *Gross, M. G. (1977). Oceanography: A view of the earth.*

டாக்டர். எம்.ஜி.ஆர்.
கல்வி மற்றும் ஆராய்ச்சி நிறுவனம்
பல்கலைக்கழகம்
மதுரவாயல், சென்னை – 600 095.

தமிழ்த்துறை
இரண்டாம் பருவம் – தமிழ்த்தாள்–II
பாடப்பகுதிகள்

அலகு–I

1. சிற்றிலக்கிய வரலாறு
2. சிறிதவ இலக்கிய வரலாறு
3. இசுலாமிய இலக்கிய வரலாறு

அலகு–II

4. நந்திக் கலம்பகம்
5. முத்தொள்ளாயிரம்
6. தமிழ்விடு தூது

அலகு–III

7. திருக்குற்றாலக் குறவஞ்சி
8. முக்கூடற்பள்ளு
9. இயேசுநாதர் பிள்ளைத்தமிழ்

அலகு–IV

10. நளவெண்பா
11. சீறாப்புராணம்

Prof. Dr. S. DINAKARAN
JOINT REGISTRAR
Dr. M.G.R.
Educational and Research Institute
University
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Periyar E.V.R. High Road
Maduravoyal, Chennai-600 095

அலகு– V

மொழிப்பயிற்சி : பண்புத்தொகை, வினைத்தொகை, உம்மைத்தொகை, உருவகம், உவமைத்தொகை, வேற்றுமைத்தொகை, அன்மொழித்தொகை, இருபெயரொட்டுப் பண்புத்தொகை.

ஒரு பொருள் குறித்த பலசொல், பல பொருள் குறித்த ஒரு சொல், அகரவரிசைப்படுத்துதல், ஒருமை, பன்மை மயக்கம், பிறமொழிச் சொற்களை நீக்குதல்.

பார்வை நூல்கள் :

1. சென்னைப் பல்கலைக்கழக வெளியீடு–2013
2. பொது இலக்கணம்

Vice Chancellor
Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
UNIVERSITY

தமிழ்த்துறைத் தலைவர்
டாக்டர் எம்.ஜி.ஆர்.
கல்வி மற்றும் ஆராய்ச்சி நிறுவனம்
பல்கலைக்கழகம்
மதுரவாயல், சென்னை - 600 095

HBEN17002	FRENCH-1I	L T P C 3 0 0 3

UNIT I **9hrs**

Cultiver ses relations

- Recevoir,Communiquer,Parler des Personnes,Donner des informations, ecrire etre a l'aise avec les autres

UNIT II **9hrs**

Decouvrir le passe

- Parler du passé, raconter les moments d'une vie, parler de la famille, preciser le moment de la duree, parler des habitudes et des changements,connaitre quelques reperes de l'histoire

UNIT III **9hrs**

Entreprendre

- Parlrr d'une enterprise, Exprimer un besoin, Parler du futur, presenter les etapes d'une realisation, Rapporter des paroles, Faire un projet de realisation

UNIT IV **9hrs**

Prendre des decisions

- Comparer des qualites, comparer des quantites et des actions, Exprimer la ressemblance ou la difference, Faire des suppositions, Comparer des lieus, Parler de la television

UNIT V **9hrs**

Faire face aux problems

- Poser un probleme, caracteriser une action,Parler de la santé,Interdire-Autoriser, Connaitre la vie politique

Total no. of hours: 45

REFERENCE:

Campus 1-Methode de francaise by Jacky Girardet, Jacques Pecheur

Department of Earth and Atmospheric Sciences

HBEN17002	HINDI-II (POETRY, HINDI COMPUTING, ALANKAR)	L T P C 3 0 0 3

UNIT I **9hrs**

1. Poetry-Virpooja, Kaidi aur kokila - kavi parichay, annotation, summary makhanlal Chaturvedi
2. Poetry-Kabirdass-Sakhi-Kantash 01-10(Doha)
3. Alankar-Aupras and Upama only

UNIT II **9hrs**

1. Poetry-Aansu,Shradha ka saundarya Annotation,Kavi Parichay,Summary
2. Poetry-Surdas-Two Padhya

UNIT III **9hrs**

1. Poetry-Subramaniya Bahrathi-Nachenge-Hum Annotation, Kavi Parichay, Summary
2. Kaam Kaji Hindi Concept of official Language and Hindi Computing Theory

UNIT IV **9hrs**

1. Poetry-Galiv-Chunin da ser-annotation, summary, Kavi Parichay
2. Computer internet in Hindi latest tools and packages

UNIT V **9hrs**

1. Kavi Parichay , Jaishan kar Prasad, Subramaniya Bharathi and Mirzagalib, Makhanlalchaturvedi
2. Slesha Alankar

Total no. of hours: 45

Department of Earth and Atmospheric Sciences

HBEN17002	ENGLISH II	L T P C 3 0 0 3

UNIT I
Prose: Literary Melodies (Orient Black Swan)
UNIT II
Poetry: Literary Melodies (Orient Black Swan)
UNIT III
Short Stories: Literary Melodies (Orient Black Swan)
UNIT IV
One Act Plays: Literary Melodies (Orient Black Swan)
UNIT V
Functional English

Total: **45 Periods**

SEMESTER II

FROM THE ACADEMIC YEAR 2017-2018

COURSE OBJECTIVES:

1. to prepare students to attain a comprehensive knowledge of the communication skills
2. to make them understand the nuances of the English language and use the vocabulary in appropriate contexts
3. to develop in students a knowledge of the various techniques in language usage
4. to develop in them analytical and interpretative skills
5. to train learners in organized, academic and business writing

Unit I- PROSE- For Detailed Study

1. Spoon Feeding	W.R. Inge
2. Disaster Management	B.M. Hegde
3. If You are Wrong Admit it	Dale Carnegie

Unit II – POETRY- For Detailed Study

1. Psalm of Life	H.W. Longfellow
2. Anthem for Doomed Youth	Wilfred Owen
3. Street Cries	Sarojini Naidu

Unit III – SHORT STORY

1. How Much Land does a Man Need?	Leo Tolstoy
2. Uncle Podger Hangs the Picture	Jerome K. Jerome

Unit IV - DRAMA

1. Excerpts from The Merchant of Venice	William Shakespeare
2. Monkey's Paw	W.W. Jacob

Unit V – FUNCTIONAL ENGLISH

Enhancing LSRW Skills through Tasks

Note: Each lesson to be followed by text-based Vocabulary, Grammar, and Usage Exercises

Synonym and Antonym, Phrasal Verb- Idioms and Phrases, Collocation. Gerund and infinitives, Auxiliaries: Primary and Modals, Use of 'as soon as', 'No sooner …..than', 'Hardly had-when', 'Scarcely had-when', 'too....to', 'so...that'- Subject- Verb Agreement

Comprehension, note- making from an unknown passage, Expanding Hints into a meaningful paragraph, Essay writing

COURSE LEARNING OUTCOME:

Students completing the general English course

1. will attain advanced comprehensive knowledge of the four skills of communication viz. LSRW
2. will understand the nuances of English language as use its vocabulary in appropriate contexts
3. will acquire the advanced knowledge of the various techniques in language usage
4. will acquire advanced proficiency in analytical and interpretative skills
5. will get trained in organized academic and business writing

Text Prescribed: Pushkala R, Padmasani Kannan, Chandrasena Rajeswaran, Anuradha V

Literary Melodies, Orient Black Swan, 2017

Text Books, Reference Books and Web Resources

1. *Pushkala R, P.A.Sarada, El Dorado: A Textbook of Communication Skills, Orient Blackswan, 2014*
2. *Padmasani Kannan.S., Pushkala.R. : Functional English*
3. *Hancock, Mark, English Pronunciation in Use; Cambridge Univ. Press, 2013*
4. *McCarthy, Michael et.al,, English Vocabulary in Use, Advanced, Cambridge Univ. Press, 2011*
5. *Wren and Martin: Grammar and Composition, Chand & Co, 2006*
6. *Part I& Part II from Spring Board by Orient Black Swan Pvt. Ltd.*
7. *http:// learenenglish. Britishcouncil.org*
8. *www.englishpage.com*
9. *www.writingcentre.uottawa.ca/hypergrammar/preposit.html*
10. *www.better-english.com/grammar/preposition.html*
11. *http://www.e-grammar.org/infinitive-gerund/*
12. *www.idiomsite.com/*

HBMA18A05	ALLIED PAPER II BASICS OF MATHEMATICS AND STATISTICS	L T P C 3 1 0 4

COURSE OUTCOMES:

To understand the Basic concepts in Differentiation
To understand the Basic concepts in Integration
To understand the Basic concepts in Statistics
To understand the Basic concepts in Probability
To understand the Basic concepts in Probability distributions

UNIT I DIFFERENTIATION 12 hrs

Basic concepts of Differentiation – Elementary differentiation methods – Parametric functions – Implicit function –Leibnitz theorem(without proof) – Maxima and Minima – Points of inflection.

UNIT II INTEGRATION 12 hrs

Basic concepts of Integration – Methods of Integration – Integration by substitution – Integration by parts – Definite integrals – Properties of definite integrals – Problems on finding Area and Volume using single integrals (simple problems).

UNIT III BASICS OF STATISTICS 12 hrs

Measures of Central Tendency – Mean –Median –Mode – Quartiles – Measures of Dispersion – The Range – Quartile Deviation –Standard Deviation (simple problems).

UNIT IV PROBABILITY 12 hrs

Axioms of Probability – Conditional probability – Total probability – Baye's Theorem – Random variable – Probability mass function – Probability density function – Properties (simple problems).

UNIT V STANDARD DISTRIBUTIONS 12hrs

Binomial – Poisson – Geometric – Exponential –Normal distributions (simple problems).

Total no. of hrs: 60

Reference Books:

1) *Shanti Narayanan, Differential Calculus, S.Chand & Co., New Delhi, (2005).*
2) *Shanti Narayanan, Integral Calculus, S.Chand & Co., New Delhi, (2005).*
3) *Gupta S.C., Kapoor V.K., Fundamentals of Mathematical Statistics, S.Chand & Co., (2007).*
4) *Veerarajan T., Probability, Statistics and, Random Processes, Tata McGraw Hill Publishing Co., (2008).*
5) *Singaravelu, Probability and Random Processes, Meenakshi Agency, (2017).*

HBPH17A02	ALLIED PAPER III -PHYSICS –II	L T P C 4 0 0 4

UNIT I PHOTOELECTRIC EFFECT & MATTER WAVES 12hrs

Photo electric effect – Einstein's photo electric equation – verification of Einstein's photo electric equation by Millikan's experiment – photo electric cells – applications- De Broglie matter waves-calculations De Broglie wave length – Experimental study of de Broglie matter wave by G.P Thomson experiment .

UNIT II SEMICONDUCTOR DIODES AND TRANSISTORS 12hrs

Semiconductors- P-type and N-type semiconductors – Junction diode and Zener Diode- Junction Diode & Zener Diode Characteristics – Junction Diode as a rectifier – Zener diode as a voltage regulator -Transistor - Characteristics – Transistor as an amplifier.

UNIT III ELECTRONIC DEVICES 12hrs

Rectifiers: Half Wave and Full Wave rectifier – Efficiency – capacitive filter- Ripple Factor
Field Effect Transistor: Types – Junction Field Effect Transistor, Metal Oxide Semiconductor Field Effect Transistor – Characteristics –Silicon Control Rectifier – Characteristics.

UNIT IV DIGITAL ELECTRONICS 12hrs

Number system: Binary system, Decimal to Binary, Octal system, Hexadecimal system, Binary - Addition, Subtraction, Multiplication and Division .
Logic Gates: OR, AND, NOT, Exclusive –OR, NOR, NAND gates, Simple combinational logic Circuits- Half adder, Full adder, BCD adder.

UNIT V OPERATIONAL AMPLIFIER 12hrs

Operational amplifier- OP-Amp – Inverting and non inverting amplifiers – Voltage amplifier, OP-Amp- Adder , Subtractor, Op-Amp comparator , OP-Amp Integrators .

Total no. of hours: 60

REFERENCE:

1. *V.K. Metha- Principles of Electronics, S. Chand & Co.*
2. *R.S. Sedha- A Text of book of Applied Electronics, S Chand & Co.*
3. *B.L. Theraja – Fundamentals of Electrical Engineering & Electronics,S. Chand & Co.*
4. *Applied Physics for Engineers- Dr. V.Rajendran & Dr.A. Marikani-Tata McGraw Hill*

Department of Earth and Atmospheric Sciences

HBGE18003	MINERALOGY	L T P C 3 1 0 4

OBJECTIVES:

To learn about the physical and optical properties of rock forming minerals. It dealsin detail about the structure, physical and chemical properties of Ortho, ring, sheet,chain and framework silicates

UNIT I INTRODUCTION AND PROPERTIES OF MINERALS 12 hrs

Crystalline and amorphous substances, structure, form, cleavage, colour, luster,transparency, streak, hardness,sp.gravity, tenacity, feel, taste, odour. Electrical,Magnetic and Thermal Properties. Empirical and Structural formula of minerals.Isomorphism, polymorphism and pseudomorphism, Atomic substitution and solidsolution in minerals. Non-crystalline minerals. Fluorescence in minerals - Metamictstate.

UNIT II NESO AND CYCLO SILICATES 12 hrs

Physical properties, chemical composition, Classification, diagnostic properties and mode of occurrence of Ortho and Ring silicates: Olivine group, Garnet group,Alumino silicates-Epidote group, Zircon, Staurolite, eryl, CordieriteandTourmaline.

UNIT III PHYLLOSILICATES AND CHAIN SILICATES 12 hrs

Physical properties, chemical composition, Classification, Optical and diagnositicproperties and mode of ccurrence of Sheet silicates and Chain silicates: Mica groupChlorite group -. Pyroxene group - Amphibolegroup.

UNIT IV TECTO SILICATES 12 hrs

Physical properties, chemical composition, Classification, Optical and diagnositicproperties and mode of occurrence of Frame work silicates: Quartz group-Feldspargroup, Feldspathoid group, Zeolite group and apolite group.

UNIT V CLAY MINERALS AND NON SILICATE MINERALS 12 hrs

Physical properties, chemical composition, Classification, Optical and diagnositicproperties and mode of occurrence of clay minerals-Non-silicate-Spinel group,Carbonates and Phosphates. Properties of precious and semi-precious minerals.

Total no of hours: 60

TEXT BOOKS

1. E.S.Dana,1935, A Text Book of , Mineralogy, John Wiley & Sons
2. L.G.Berry Mason, 1961, Mineralogy, W.H.Freeman& Co.,

REFERENCES

1.Rutley(1985).Elements of Mineralogy.CBS Publishers.
2.W.A.Deer, R.A.Howie and J.Zussman, 1966, An Introduction to the Rock Forming minerals, Longmans.
3.Alexander N. Winchell, 1968, Elements of Optional Mineralogy, Parts I and II, Wiley Eastern (P) Ltd.,
4.Ernest, E.Walhstrom, 1960, Optical Crystallography, John Wiley & Sons.
5.Kerr,B.F.,1995, Optical Mineralogy5th Ed. Mc Graw Hill, New York.

HBGE18L02	PROFESSIONAL SKILLS I MINERALOGY LAB	L T P C 0 0 3 2

MEGASCOPIC IDENTIFICATION OF ROCK-forming silicates on the basis of their physical properties; chemical composition and determination of system of crystallization of the followinggroups of minerals

QUARTZ GROUP: Rock crystal, Blue Quartz, Rose Quartz, Grey Quartz, Amethyst,

Chalcedony,Opal, Agate, Flint, Jasper.

FELDSPAR GROUP: Orthoclase, Microcline, Perthite, Sanidine, Albite, Oligoclase,

Labradorite,and Anorthite.

FELDSPATHOID GROUP: Nepheline, Sodalite, Lazurite, Lapis lazuli

PYROXENE GROUP: Enstatite, Bronzite, Hypersthene, Augite, Diopside, Rhodonite, Wollastonite.

AMPHIBOLE GROUP: Anthophyllite, Actinolite, Tremolite, Hornblende, Glaucophane

MICA GROUP: Muscovite, Biotite, Phlogopite, Lepidolite, and Vermiculite.

OTHER SILICATES : Olivine, Chlorite, Epidote, Garnet, Apophyllite, Natrolite, Stilbite, Talc Steatite, Beryl, Kaolin, Cordierites, Apatite, Andalusite, Sillimanite, Kyanite, Staurolite,Tourmaline, Topaz, Calcite, Dolomite, Fluorspar, Zircon.

MICROSCOPIC IDENTIFICATION OF ROCK-FORMING SILICATES ON THE BASIS OF THEIROPTICAL PROPERTIES.QUARTZ

FELDSPARS: Orthoclase, Albite, Oligoclase, Andesine, Labradorite, and Anorthite.

FELDSPATHOIDS: Nepheline, Leucite, Sodalite, Nosean and Hauyne

PYROXENES: Hypersthene, Augite, Aegerine, and Diopside.

AMPHIBOLES: Tremolite, Actinolite, Hornblende, and Glaucophane.

MICAS: Muscovite, Biotite, Phlogopite and Vermiculite.

MISCELLANEOUS MINERALS: Olivine, Serpentine, Chlorite, Epidote, Garnet, Apatite, Zircon,Sphene, Magnetite, Tourmaline, Calcite, Dolomite, Andalusite, Staurolite, Sillimanite and Cordierite.

Total no of hours: 30

TEXT BOOK

1.Rutley(1985).Elements of Mineralogy.CBS Publishers.

Department of Earth and Atmospheric Sciences

HBPH17AL1	ALLIED LAB I PHYSICS LAB	L T P C 0 0 3 2

LIST OF EXPERIMENTS

1. Torsional pendulum
2. Sonometer-Verification of laws
3. Wavelength of light-Laser diode
4. Specific resistance-potentiometer
5. Laws of resistance-Verification
6. Diode characteristics
7. Zener diode characteristics
8. Transistor characteristics

Total No. of Hours :30

Department of Earth and Atmospheric Sciences

		L T P C
HBCH18A03	**ALLIED PAPER IV** **CHEMISTRY (For Geology and Surveying and Spatial science)**	**4 0 0 4**

OBJECTIVES:

- To get a good exposure on the basic concepts of periodicity and chemical bonding
- To enable learner acquire knowledge about Nuclear Chemistry
- To enhance the Analytical skill with chromatography and UV –Vis spectroscopy.

UNIT I CHEMICAL PERIODICITY 12hrs

Periodic table, group trends and periodic trends in physical properties. Classification of elements on the basis of electronic configuration. Modern IUPAC Periodic table. General characteristic of s, p, d and f block elements. Effective nuclear charges, screening effects, atomic radii, ionic radii, covalent radii. Ionization potential, electron affinity and electro-negativity. Group trends and periodic trends in these properties in respect of s-, p- and d-block elements. General trends of variation of electronic configuration, elemental forms, metallic nature, magnetic properties, catenation and catalytic properties, oxidation states, aqueous and redox chemistry in common oxidation states

UNIT II IONIC AND COVALENT BONDING 12hrs

Ionic bonding: Size effects, radius ratio rules and their limitations. Packing of ions in crystals, lattice energy, Born-lande equation and its applications, Born-Haber cycle and its applications. Solvation energy, polarizing power and polarizability, ionic potential, Fajan's rules. Defects in solids. **Covalent bonding**: Lewis structures, formal charge. Valence Bond Theory, Molecular orbital Theory, hybridizations, VSEPR theory. Partial ionic Character of covalent bonds, bond moment, dipole moment and electro negativity differences.

UNIT III COORDINATE BONDING 12hrs

Werner theory of coordination compounds, double salts and complex salts, Lewis acid-base. Ambidentate and polydentate ligands, chelate complexes. IUPAC nomenclature of coordination compounds. Coordination numbers, Geometrical isomerism. Stereoisomerism in square planar and octahedral complexes. Hydrogen bonding. Metallic bonding: qualitative idea of band theory, conducting, semi conducting and insulating properties.

UNIT IV NUCLEAR CHEMISTRY 12hrs

Radioactive decay - General characteristics, decay kinetics, parent-daughter decay growth relationships, determination of half-lives, Nuclear models -shell model, liquid drop model, Fermi gas model, Collective model and optical model. Nuclear stability.**Decay theories**. Nuclear reactions-fission, fusion and spallation reactions. Definition of curie and related calculations, preparation of artificial radionuclides by bombardment, radiochemical separation techniques. Experimental techniques in the assay of radioisotopes, gas filled detectors-ionization chamber, proportional and Geiger-Muller counters .

UNIT V ANALYTICAL CHEMISTRY 12hrs

Chromatographic methods of analysis:Basic principles and classification of chromatography. Importance of column chromatography and thin layer chromatography; Theory and principles of High Performance Liquid Chromatography (HPLC) and Gas Liquid Chromatography (GLC). Ion-exchange chromatography.UV-Visible Spectroscopy:Basic Principles of UV-Vis spectrophotometer. Lambert -Beer's Law and its limitations. Instrumentation consisting of source, monochromator, grating and detector. Spectrophotometric determination.

Total No of Periods:60

REFERENCES

1. *P.L.Soni ,Inorganic Chemistry, Sultan Chand &Sons,New Delhi(2004).*
2. *B.S.Bahl&ArunBahl,A text book of Organic Chemistry,18th Edition,S.Chand& Co., New Delhi(2006).*
3. *B.S.Bahl,ArunBahl&G.D.Tuli,Essentials of Physical Chemisty,S.Chand& Co., New Delhi(2004).*

HBGE18004	ENVIRONMENTAL GEOLOGY	L T P C 3 0 0 3

UNIT I INTRODUCTION 9 hrs

Scope and objectives. Ecological perspectives of environment. Meaning ofEcology. Biotic Communities. Anthropogenic changes in Ecosystem. Land use planning and natural hazards.Hydrological cycle and its components, precipitation, rain gauges, evaporation, transpiration, evapotranspiration,instruments for measurements. Infiltration and percolation, instruments for measurement. Surface runoff and its measurements. Concepts of watershed, drainage network and their relation to surface runoff and infiltration. Hydrological characteristics of rocks and soils: porosity, permeability, specific retension, specific yield.

UNIT II GROUND WATER 9 hrs

Definition of subsurface water and groundwater, saturated and unsaturated zones, water in the unsaturated zone,vertical distribution of surface water, types of groundwater such as juvenile, connate, magmatic water, meteoric water.

UNIT III HYDROGEOLOGY 9 hrs

Definition of an aquifer, types of aquifers, confining layers and types with examples. Aquifer parameters: transmitivity,storativity, specific yield, hydraulic conductivity and methods of determination (pumping tests. Water quality:parameters of water quality; physical, chemical and biological, major, minor and trace constituents, ISI standards fordrinking water.

UNIT IV MINING GEOLOGY 9 hrs

Mining, mining methods, hazards and environmental impact due to mining. Environmental Impact Assessment (EIA).Environmental Management in Mining (EMP). Utilisation and conservation of mineral resources. Estimation of orereserves.

UNIT V ENVIRONMENTAL GEOLOGY 9 hrs

Geotechnical Projects: Investigation and the role of geologists. Dams and reservoirs: types of dams, site selection, stability and failure of dams. Foundation geology, seismicity and environmental impact. Tunnels; stress conditions intunnels, influence of geological conditions, changes in water regime, environmental impact and remedial measures.

Total no of hours: 45

TEXT BOOK

1. Valdiya K. S.(2013). Environmental Geology.(2nd Edition).MHE.

REFERENCES

1.Bennett,M.R. and Doyle,P.(1997). Environmental geology, Wiley and Sons

Department of Earth and Atmospheric Sciences

HBGE18005	GEOMORPHOLOGY	L T P C 3 0 0 3

UNIT I INTRODUCTION **9 hrs**

Scope and aim of geomorphology. Brief introduction to geomorphic cycles Fundamental concepts,weathering,ass-wasting andrelated landforms. Fluvial cycle of erosion. Mackin's concept of graded streams.Drainagepatterns and their significance.

UNIT II MAJOR MORPHOLOGICAL FEATURES **9hrs**

Geoid, Topography, Hypsometry, Global Hypsometry, Major Morphological features Large ScaleTopography –Ocean basins, Plate tectonics overview, Large scale mountain ranges (with emphasis on Himalaya).

UNIT III GEOMORPHIC AGENTS **9 hrs**

Classification of landforms,

Wind as geological agent: - definition – cause – erosional, transport, and depositional activity – landforms reated by wind action: sand dunes and their types – yardangs –loess. Short account of Indiandeserts.

Rivers as a geological agent: - definition – origin –types – erosional, transport, and depositional activity – fluvial landforms due to erosion and depositions –drainage patterns –stages in the rivers life cycle –stream capture and piracy – river rejuvenation –short account of Indian rivers.

Glaciers as a geological agent: Definition – formation – types – movement – glacial erosion and deposition – landforms – glaciofluvial deposition – landforms – glaciofluvial deposits –causes of glaciation – short account of Indian glaciers

Sea and oceans as a geological agent: Definition, waves geological work of wave action –geological work of waves –coastal landforms created by waves - shoreline and their types.Submarine geomorphology:- feature of continental margins and deep ocean basins – submarinecanyons. Types of ocean sediments and deposits. Coral reefs and atolls. Short account of Indiancoasts.

UNIT IV KARST TOPOGRAPHY,MORPHOMETRY **9 hrs**

Karst topography, Aeolian and glacial cycles, Concept of morphometric regions, Topography developed overfolded and faulted structures. Brief idea about applied geomorphology

UNIT V APPLIED GEOMORPHOLOGY **9 hrs**

Applied aspects of geomorphology with case studies.

Total no of hours: 45

TEXT BOOKS

1. Bloom, A.L.(1998). Geomorphology: A Systematic Analysis of Late Cenozoic Landforms, Pearson Education
2. Thornbury ,W.D.(2004).Principles of Geomorphology Second Edition, John Wiley&sons

REFERENCES

1. *Robert S. Anderson and Suzzane P. Anderson (2010): Geomorphology - The Mechanics and Chemistry of Landscapes. Cambridge University Press.*
2. *M.A. Summerfield (1991) Global Geomorphology. Wiley & Sons.*
3. *Esterbrook, D.J., 1992. Surface Processes and Landforms, MacMillan Publications*

HBGE18006	PALAEONTOLOGY	L T P C 3 1 0 4

OBJECTIVE:

To study about the Palaeo life in the world, habitats of animals, indicators of evolution and migration of life forms, General morphology and classification of fossil belonging to phylum Arthropoda, Mollusca, Brachiopoda, protozoa,plant fossils and Applications of Micro palaeontology

UNIT I INTRODUCTION 12 hrs

Definition of fossils – nature and modes of preservation of fossils: Unaltered hard parts, Altered hard parts : Petrifaction , permineralisation ,carbonisation, recrystallisation, silicification; trace fossils, - mould, casts,tracks , trails, borings; Uses of fossils – stratigraphic indicators, index fossils– climatic indicators. indicators of evolution and migration of life forms –indicators of new deposits of coal and petroleum.

UNIT II PROTOZOA AND PORIFERA 12 hrs

Phylum protozoa – Order: Foraminifera: General morphology – dimorphism –classification , geological history and stratigraphic importance. Class Crustacea: Sub class: Ostracoda – morphology. Applications of Micropalaeontology. Phylum Porifera – A short account of sponges

UNIT III COELENTERATA,ECHINODERMATA,BRACHIOPODA 12 hrs

Phylum coelentrata – class Anthozoa – General morphology : classification –tabulate corals – Rugose corals. Sub phylum Hemichordata – class Graptozoa:order Dendroidea and Graptoloidea. Phylum Echinodermata: ClassEchinoidea: General morphology, corona (Ambulacra, inter ambulacra) – peristome – regular and irregular echinoids. Class Crinoidea:- Generalmorphology. Class Blastoidea: General morphology. Phylum Brachiopoda:-General morphology – Brachial skeleton – morphometric details and ornamentation.

UNIT IV MOLLUSCA AND ARTHROPODA 12 hrs

Phylum Mollusca: Class Pelecypoda - General characters – ornamentation.Class Gastropoda:- General morphology, shell forms – types of coiling –Dextral and sinistral – ornamentation. Class Cephalopoda: Generalmorphology, (Nautilitic, Gonioatitic, Ceratitic and Ammonitic) – shell forms – ornamentation. morphology of a Belemnite shell. Phylum Arthropoda: Class –Trilobita- General morphology.

UNIT V VERTEBRATES PALEONTOLOGY AND PALEOBOTANY 12 hrs

Outline of the classification of vertebrates. Devonian fishes, Mesozoic Reptiles,Siwalik mammals. General classification of plant kingdom – plant fossils fromIndia –plant fossils :Glossopteris , Gangamopteris ,otozamites , Ptilophyllum ,Calamites , Lepidodendron and Sigillaria.

Total no of hours: 60

TEXT BOOKS:

1. Henry woods(1961) : Inveretebrate Palaeontolgy – Cambridge.
2. Romer , A.S.(1966) : Vertebrate Palaeontology, Chicago press.
3. Arnold, C.A.,(2008) : An introduction to Palaeobotany., MC-Graw Hill.
4. B.U. Hag and A. Boersma (1978) : Introduction to marine Micropalaeontology. Elsevier, Netherlands
5. Jain, P.C., and Anatharaman, M.S., (1983) (An introduction to Paleontology, Vishal Publications.

REFERENCES:

1. *Raup, D.M. and Stanely, M.S.(2006) : Principles of Palaeontology, CBS Publishers.*
2. *Moore , R.C., Laliker , C.G.&Fishcher, A.G.(1952): Invertebrate Fossils , Harper brothers*
3. *Shrock. R.R. and Twenhofel , W.H – (1953) : Principles of invertebrate Palaeontology, Amold publication Easton - Invertebrate Paleontology*

Department of Earth and Atmospheric Sciences

HBMG17L01	SOFT SKILL I	L T P C 0 1 1 2

COURSE OBJECTIVES:

1. to diagnose the strength and weakness of the student in Functional English
2. to develop the functional grammar
3. to prepare them to use Functional English through LSRW
4. to make them learn through practice and activity
5. to use English Language as a life skill

Prelude

Diagnostic Test- Articles, Forms of 'be' verbs, Tense, Preposition, Gerunds & Infinitives, Reported Speech, Active &Passive Voice, Letter Writing

Unit I **6 hours**

Aticles- Definite, Indefinite and omission of articles

Unit II **6 hours**

Verbs- 'be' forms, 'have' forms, concordance of verb

Unit III **6 hours**

Preposition- Infinitives and gerunds

Unit IV **6 hours**

Sentence structure- questioning, Tag Questions, Reported Speech, Active & passive voice

Reading and writing

Unit V **6 hours**

Letter Writing- Formal

Total: **30 Periods**

TEXT BOOK , REFERENCE BOOKS AND WEB RESOURCES:

1. Soft Skill for Everyone-Jeff Butterfield,Part-1; Unit-D&E
2. EFA (English For All)- Dr. Padmasanni Kannan, Libin Roy Thomas
3. English for Competitive Exam- R.P. Bhatnagar,Rajul Bhargava
4. Soft Skill Blog
5. Jobsearch.about.com
6. www.exsearch.in/interview.html

COURSE LEARNING OUTCOME:

Students completing the course Soft Skill-I will be able to

1. know their weakness in the use of English Language
2. understand the functionality of the language in simple context
3. improve their communication skill through LSRW
4. improve the functional grammar through practice and activity
5. understand the necessity of English Language

Department of Earth and Atmospheric Sciences

HBCH18AL1	ALLIED LAB II CHEMISTRY LAB	L T P C 0 0 3 2

(1) Estimation of temporary, permanent and total hardness of water.
(2) Determination of type and extent of alkalinity in water.
(3) Estimation of dissolved oxygen in a water sample.
(4) Conductometric titration of strong acid vs. strong base
(5) Conductometric precipitation titration using barium chloride and sodium sulphate.
(6) Determination of single electrode potential.
(7) Estimation of Fe^{2+}ion by potentiometry.
(8) Determination of Molecular Weightand Degree of Polymerisation of Polymer by viscometry.
(9) Determination of rate of corrosion by weight loss method.

Total No. of Hours :30

Department of Earth and Atmospheric Sciences

HBGE18L03	PALAEONTOLOGY LAB	L T P C 0 0 3 2

Paleontology:

Identification of fossils on the basis of morphological characters and fixing the biologicalposition and range in geological time for the following classes of fossils.

Pelecypods : Meretrix, Arca, Cardium, Cardita, Pecten, Venus, Unio, Pinna,Modiola, Lima, Inoceramus, Lopha(Alectryonia), Gryphaea, Exogyra,Spondylus, Pectenculus, Radiolites, Trigonia and Ostrea.

Gastropods : Turritella, Cerithium, Turbo, Trochus, Natica, Conus, Fusus,Physa, Busycon, Voluta, Murex, Bellerophon, Helix, Cypraea,and Euomphalus.

Cephalopods : Orthoceras, Nautilus, Goniatites, Ceratites, Acanthoceras,Schloenbachia, Scaphites, Perisphinctes, Turrilites, Baculites,& Belemnites

Brachiopods : Lingula, Lingulella, Spirifer, Productus, Terebratula,Rhynchonella, Pentamerus, Atrypa and Athyris.

Anthozoans : CalceolaZaphrentis, Montilivaltia, Cistiphyllum, Thecosmilia,Cyclolites, Favosites, Omphyma, Halysites and Lithostrotion.

Echinoidea : Echinus, Cidaris,emicidaris, Micraster, Holaster, Hemiaster andStigmatophygus.

Crinoidea : Encrinus, Apiocrinus and Pentacrinus

Blastoidea : Pentremites.

Trilobites : Paradoxides, Calymene, Olenellus, Olenus, Asaphus,Trinucleus,Phacops.

Graptolites : Monograptus, Rastrites, Diplograptus, Phyllograptus, Tetragraptus.

Plant fossils : Glossopteris, Gangamopteris, Ptilophyllum, LepidodendronSigillaria, Stigmaria, Calamities.

Foramanifiera: Textularia, Quinqueloculina, Globigerina, Lagena and Nummulites.

Porifera : Siphonia and Ventriculites.

Total no of hours: 30

TEXT BOOKS:

1.Henry woods(1961) : Inveretebrate Palaeontolgy . Cambridge.
2.Romer , A.S.(1966) : Vertebrate Palaeontology, Chicago press.
3.Jain, P.C., and Anatharaman, M.S., (1983) (An introduction to Paleontology, Vishal Publications.

REFERENCES:

1. *Raup, D.M. and Stanely, M.S.(2006) : Principles of Palaeontology, CBS Publishers.*

Department of Earth and Atmospheric Sciences

HBGE18007	IGNEOUS AND METAMORPHIC PETROLOGY	L T P C 3 1 0 4

UNIT I CLASSIFICATION,STRUCTURE AND FORMS OF ROCKS 12 hrs

Materials of the earth's crust rocks, their three main group –Igneous sedimentary and metamorphic rocks Forms structures and textures of igneous rocks, Main Constituents of igneous rocks. Petrographic provinces.

UNIT II MAGMA CRYSTALLIZATION: UNICOMPONENT, BINARY AND TERNARY SYSTEMS 12 hrs

Crystallisation of unicomponent and binary magmas with eutectic and soild solution rections –Bowen 's Reaction series – Tenary system represented by Albite Anorthite- Diopside – Reaction principle-Diversity due to Differentiation and Assimlation – Classifcation of igneous rocks.

UNIT III TEXTURE OF IGNEOUS ROCKS 12 hrs

Textures mineral composition and occurrence of the following important igneous rocks; Granite , syenite , Diorite Gabbro peridetite , Dunite ' Rhyolite Trachyte and Basalt

UNIT IV TEXTURE AND STRUCTURE OF METAMORPHIC ROCKS 12 hrs

Metamorphism and its agents – kinds of metamorphism- Structure ,texture and Classifcation Contact metamorphism of impure argillaceous rocks- Thermal metamorphism of impure calcareous rocks-Dynamo thermal metamorphism of impure argillaceous rocks and impure calcareous rocks

UNIT V TYPES OF METAMORPHISM 12 hrs

catalclasstic metamorphisc – plutonic metamorphisc-pneumata-lysis Retrogressive Metamorphisc-Anatexis –palingenesis-Megascopic and microscopic study of the following important metamorphisc rocks; marble Quartxite state. Phyllite schist and gneiss

Total no of hours: 60

TEXT BOOKS

1. Tyrell,G.W(1999). Principles of Petrology.AITBS Publishers,India

REFERENCES

1.*Ehlers,E.G/Blatt,H.(1999).Petrology Igneous,Sedimentary and Metamorphic.,CBS Publishers*

Department of Earth and Atmospheric Sciences

HBGE18008	STRUCTURAL GEOLOGY AND SEDIMENTARY PETROLOGY	L T P C 3 1 0 4

UNIT I INTRODUCTION **12 hrs**

maps –methods of representing physiographic features – contours –topographic maps.

Attitude of beds;Dip and strike –Trends of out crops – simple problems involving dip apparent dip-thinness of beds and width of outcrops.

UNIT II FOLDS AND JOINTS **12 hrs**

Folds; Flowage and fracture –type of folds –general characters – causes and effect of folding – recognition of folds in fields and in geological maps.

Joints; General features, classification .

UNIT III FAULTS AND UNCONFIRMITY **12 hrs**

Faults; General characters, types. Classification, cause and effects on outcrops .Recognition of faults in field and in geological maps.Unconformity; General characters, types and recognition Their significance in historical geology.

UNIT IV OROGENESIS **12 hrs**

Inliers and outliers Mountains; orogenesis and Epiorogenesis-their causes and effect on physiography-principal mountain chains.

UNIT V SEDIMENTARY PETROLOGY **12hrs**

Sedimentary petrology; structures and textures and classification-petrography of residual clastical and organic deposits megascopic and microscopic study of the following important sedimentary rocks – conglomerate Breccia sand stone Grit ,shale, clays ,Limestones, coals and iron stones.

Total no of hours: 60

TEXT BOOKS

1. Billings,M.P.(1972).Structural Geology.(3rd Edition).Prentice Hall India

REFERENCE BOOKS

1. *Ehlers,E.G/Blatt,H.(1999).Petrology Igneous,Sedimentary and Metamorphic.,CBS Publishers*

Department of Earth and Atmospheric Sciences

HBGE18009	SURVEYING	L T P C 3 1 0 4

OBJECTIVES:

- To measure the land area by chaining and the methods of clearing the obstacles.
- To measure the area and distance between the points by compass and plane table .
- To measure the elevation of points for the preparation of map.
- To measure the height and distance by theodolite.

UNIT I INTRODUCTIONS AND CHAIN SURVEYING 12Hrs

Definition - principles - classification - survey instruments - ranging and chaining - reciprocal ranging – setting perpendiculars –errors - traversing.

UNIT II COMPASS SURVEYING AND PLANE TABLE SURVEYING 12 Hrs

Prismatic compass - surveyor's compass - bearing - systems and conversions - local attraction – magnetic declination - dip - adjustment of error - plane table instruments and accessories – merits and demerits -methods - radiation - intersection - resection.

UNIT III LEVELLING AND APPLICATIONS 12 Hrs

Level line - horizontal line - levels and staves - sprit level - bench marks - temporary and permanent adjustments - flyand check leveling - reciprocal leveling - longitudinal and cross sections.

UNIT IV CONTOURING 12Hrs

Contouring - methods –characteristics and uses of contours - plotting - calculation of areas and volumes- earth work volume.

UNIT V THEODOLITE SURVEYING 12Hrs

Theodolite - vernier - description and uses - temporary and permanent adjustments of vernier transit – swinghorizontal angles - vertical angles – measurements of angles and distances - omitted measurements.

Total no of hours: 60

TEXT BOOKS

1. Kanetkar T.P., “Surveying and Levelling ", vols. I and II, United Book Corporation, Pune, 1994.
2. Punmia B.C., “Surveying ", Vols. I and II, Laxmi Publications, Mumbai, 1999.
3. N.N basak., “ Surveying and Levelling ", Tata McGraw Hill, New Delhi, 2004.

REFERENCES

1. Clark D., Plane and Geodetic Surveying ", vols. I and II and C.B.S. Publishers,New Delhi, Sixth edition,1991.
2. James M. Anderson and Edward M. Mikhail, “Introduction to Surveying ", Tata McGraw Hill, New Delhi,1995

Department of Earth and Atmospheric Sciences

HBGE18010	DISASTER MITIGATION AND MANAGEMENT	L T P C 3 0 0 3

OBJECTIVES:

- Disaster management refers to the policies, programs, administrative actions and operations undertaken to address a natural or man-made disaster through preparedness, mitigation, response and recovery.

UNIT I INTRODUCTION TO DISASTERS 9Hrs

Concepts, and definitions-Disaster, Hazard, Vulnerability, Resilience, Risks Disasters: Classification, Causes,Impacts -including social, economic, political, environmental, health, psychosocial, etc.

UNIT II RISK MANAGEMENT 9Hrs

Goals and objectives of ISDR Programme- Risk identification – Risk sharing – Disaster and development.Development plans and disaster management –Alternative to dominant approach – disaster-development linkages –Principle of risk partnership.

UNIT III RISK REDUCTION 9Hrs

Trigger mechanism – constitution of trigger mechanism - risk reduction by education -disaster information network -risk reduction by public awareness Application of various technologies: Data bases - RDBMS – Management Information systems - Decision support system and other systems - Geographic information systems Remote sensing-an insight - contribution of remote sensing and GIS - Case study.

UNIT IV INTER-RELATIONSHIPS BETWEEN DISASTERS AND DEVELOPMENT 9Hrs

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments,changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technologyand local resources financial arrangements – areas of improvement –disaster preparedness — emergency response.

UNIT V DISASTER RISK MANAGEMENT IN INDIA 9Hrs

Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health,Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programmes and legislation)

Total no of hours: 45

TEXT BOOKS

1. PardeepSahni, Madhavi Malalgoda and Ariyabandu, “Disaster risk reduction in Southasia”, PHI
2. Amitasinvhal(2010). “Understanding earthquake disasters” TMH, 2010.

REFERENCES

1. Pardeepsahni, AlkaDhameja and Uma medury, “Disaster mitigation: Experiences and reflections”, PHI

Department of Earth and Atmospheric Sciences

HBMG17L02	SOFT SKILLS - II	L T P C 0 1 1 2

COURSE OBJECTIVES:

1. to strengthen the students with the needed vocabulary
2. to infer information from the given passage through reasoning
3. to train them in attending Group Discussion
4. to face the Technical and HR interview of the corporate
5. to raise communication proficiency to global standards

Unit 1 **6 hours**

Vocabulary and comprehension (Spelling, Synonyms, Antonyms, Phrasal Verbs, Spotting the error, Cloze, Verbal Analogy) Resume Preparation

Unit II **6 hours**

Group Discussion

Unit III **6 hours**

Mock Interview

Unit IV (Department of Mathematics) **6 hours**

Aptitude- I

Unit V **6 hours**

Aptitude- II

Total: **30 Period**

TEXT BOOKS, REFERENCE BOOKS AND WEB RESOURCES:

1. Soft Skill for Everyone-Jeff Butterfield,Part-1; Unit-D&E
2. EFA (English For All)- Dr. Padmasanni Kannan, Libin Roy Thomas
3. English for Competitive Exam- R.P. Bhatnagar,Rajul Bhargava
4. Placement Interview- S.Anandamurugan,Chapter-2&3
5. Alex K, Soft Skills ; S. Chand & Company Pvt Ltd, 2009
6. Rizvi Ashraf M, Effective Technical Communication ; Tata McGraw – Hill ; 2005
7. Thorpe, Edgar, Course in Mental Ability and Quantitative Aptitude : Tata McGraw – Hill, 2003
8. Agarwal, R.S, A Modern Approach to Verbal and Non-verbal Reasoning, S. Chand & Co ;2004
9. R.S.Agarwal, Quantitative Aptitude for Competitive Examinations, S.Chand & Co., (2017)
10. Jobsearch.about.com
11.www.exsearch.in/interview.html

COURSE LEARNING OUTCOME:

Students completing the course Soft Skill-II will

1. be strengthened in the vocabulary
2. improve their reasoning and finding a logical sequence in the passage given
3. be prepared to face Group Discussion
4. know the nuances of the interview of the corporate
5. raise communication proficiency to global standards

HBGE18L04	PETROLOGY LAB	L T P C 0 0 3 2

MEGASCOPIC IDENTIFICATION OF THE FOLLOWING ROCKS:

Granite, Graphic granite, Pegmatite, Aplite, Schorl Rock, Granite Porphyry,Syenite, Syenite porphyry, Diorite,Gabbro, Anorthosite, Dunite, Pyroxenite,Dolerite, Dolerite Porphyry, Basalt, Trachyte, Rhyolite, Obsidian,Pumice,Scoria. Conglomerate, Breccia, Sandstone, Arkose, Shale, Limestone, Laterite,Peat, Lignite,Slate,Phyllite, Schists, Gneisses, Quartzite, Marble, Amphibolite,Ecologite, Leptynite, Charnockite,Khondalite, and Basic Granulite.

MICROSCOPIC IDENTIFICATION AND DESCRIPTION OF THE FOLLOWING ROCKS:

Mica Granite, Hornblende Granite,Tourmaline Granite, Schorl Rock, Aplite,Graphic Granite, Mica Syenite,Hornblende Syenite, Nepheline Syenite, Diorite,Gabbro, Norite, Dunite, Peridotite, Granite – porphyry.Syenite – porphyry,Diorite – porphyry, dolerite, minette, Vogasite, Anorthosite, Trachyte,Andesite,Basalt, Phonolite, Volcanic Breccia, Vitrophyre, Conglomerate, Breccia,Sandstone, Arkose,Shale Limestone, Slate, Chlorite Schist, Mica Schist,Kyanite Schist, Staurolite Schist, Garnetiferous Schist, Glaucophane Schist,Granulite, Charnockite, Ecologite Amphibolite, Leptynite, Khondalite,Cordierite, Gneiss, Garnet – Sillimanite Gneiss, Calc Granulite.

Total no of hours: 30

TEXT BOOKS

1. Tyrell,G.W(1999). Principles of Petrology.AITBS Publishers,India

REFERENCES

1.Ehlers,E.G/Blatt,H.(1999).Petrology Igneous,Sedimentary and Metamorphic.,CBS Publishers

HBGE18L05	STRUCTURAL GEOLOGY AND SURVEY LAB	L T P C 0 0 3 2

STRUCTURAL GEOLOGY

Contour maps and their interpretation. Exercises to predict trends of the outcrop of Horizontal, vertical anticline beds with respect to topography –reading of solid conformable maps – deciphering dip and strike of outcrops –construction of map with three points over a bedding plane are givenconstruction of vertical sections-order of super position – vertical thickness offormations.Reading of solid fold and fault maps construction of vertical sections –Determination of throw of vertical faults. Reading of unconformable solidmaps – construction of sections. Reading of solid maps of areas when more than one structure is involved – determination of comparative ages ofstructures and intrusions – narrate geological history of an area. Structural Problems – problems relating to true dip and apparent dip;Determination of vertical and true thickness.Basic map components. Description of features in Survey of India's (SOI)toposheet: Extramarginal, marginal, intramarginal information, majorconventional signs and symbols, physical and socio-cultural features.

SURVEYING:

Chain survey – prismatic compass survey – plane table survey – leveling.Clinometer Compass and Brunton Compass:-To find out dip and strike of thebeds. GPS:-Fundamentals and applications.

Total no of hours: 30

TEXT BOOK

1.Lahee,F.H.(1961).Field Geology.McGraw Hill.

HBGE18011	STRATIGRAPHY AND INDIAN GEOLOGY	L T P C 4 0 0 4

UNIT I INTRODUCTION 12 hrs

Definition of Stratigraphy.Principles and laws of stratigraphy - Correlations – concept of Homotaxis – Contemporaneity –Stratigraphic Nomenclature: Litho, Bio, Chrono Stratigraphic units – Geological Time Scale –Standard Geological divisions – Imperfections in geological records.

UNIT II PHYSIOGRAPHIC DIVISIONS OF INDIA, ARCHEAN GROUP 12 hrs

Physiographic divisions of India – Structure and tectonic divisions of India: Peninsular India,Extra Peninsular India and Indo-Gangetic plains – Study of the Archaean groups – DharwarSystem of Karnataka –CuddapahSupergroup, Delhi Supergroup.

UNIT III PALEOZOIC GROUP 12 hrs

Study of the following geological formations of India: VindhyanSupergroup, KurnoolSupergroup – Palaeozoic Formation: Cambrian of Salt range – Haimanta system of Spiti –Ordovician, Silurian and Devonian of Spiti – Carboniferous of Spiti and Kashmir – Permian ofSalt Range and Spiti.

UNIT IV MESOZOIC GROUP 12 hrs

Gondwana Sequence - Classification, Lithology, Deposits, Fossils, Climate and Economic Importance – Triassic of Spiti – Jurassic of Kutch – Cretaceous of Trichinopoly and Narmada Valley.

UNIT V CENOZOIC GROUP AND RECENT 12 hrs

Deccan Traps – Distribution, Structure – Lameta beds – Intertrappean and Infratrappean beds – Bagh beds. Tertiary Succession: Rise of Himalayas –Geological succession of Assam, Tamil Nadu and Kerala – Siwalik Group– Pliestocene ice ages in India – Karewa formation – Recent formation: Alluvial deposits.

Total no of hours: 60

TEXT BOOKS

1. M.S. Krishnan (1986) Geology of India and Burma, Higginbothams, CBS publishers,6th Edition.
2. D.N. Wadia (1953) Geology of India, Tata McGraw - Hill Publishing Company Ltd.,New Delhi.
3. Ravindrakumar (1985) Fundamentals of Historical Geology and Stratigraphy of India,Wiley Eastern Ltd., NewDelhi.

REFERENCES

1. Sam Boggi Jr. (1987) – Principles of Stratigraphy and Sedimentology, Merril Co.
2. A.J. Weller (1966) Stratigraphic Principles and Practice University Book Depot,New Delhi.

HBGE18012	ECONOMIC GEOLOGY	L T P C 3 1 0 4

OBJECTIVE:

To study about the Materials of mineral deposits its Magmatic processes ,Sedimentary and metamorphic processes of economic minerals, Fossils fuelsuses, origin and distribution in India and important oil fields of India.

UNIT I INTRODUCTION 12 hrs

Historical development of economic Geology. Materials of mineral deposits – oreminerals, gangue minerals, tenor and grade or ores. classification of mineral deposits. Outline of Lindgren's and Bateman's classification.Controls of ore localization – structural controls, stratigraphic physical and chemical – briefstudy of metallogenetic epochs and provinces – geologic thermometers.

UNIT II PROCESS OF MINERAL FORMATION 12 hrs

Process of mineral formation - primary and secondary process: brief outline of magmatic- sublimate-contact metasomatic- hydrothermal- metasomaticreplacement, sedimentary-evaporates-placer deposits-residual xidation and supergene enrichment and metamorphic deposits.

UNIT III ECONOMIC MINERALS OF INDIA(NON METALLIC) 12 hrs

Diagnostic properties, chemical composition, modes of occurrence and distribution in India**.** Diagnostic physical properties, chemical composition, uses, modes of occurrence and distribution in India of the following economic minerals.Graphite, Realgar, Orpiment, Stibinite, Molybdenite, Cinnabar, Anglesite,Barite, Gypsum, Celestite, Corundum, Ochre, Ilmenite, Chromite, Franklinite,Cassiterrite, Magnesite, Cerussite, Halite, Fluorite, Phosphatic Nodule,Monazite, Wollastonite, Colembite, Tantalite, Samarskite, Asbestos, Steatiteand Vermiculite. Mineralogy, mode of occurrence, uses and distribution inIndia of the following precious metals and minerals. Gold deposits –Gemstones. Character, distribution and mode of occurrence of structures andbuilding materials.

UNIT IV ORE MINERALOGY 12 hrs

Mineralogy, mode of occurrences, uses and distribution in India of thefollowing metalliferous deposits – Iron, Manganese, Aluminium, Copper, Lead,Zinc, Chromium. Fossils fuels:– Coal – uses, classification, constitution, originand distribution in India. Petroleum- composition, uses, theories of origin, oiltraps, and important oil fields of India. Outline of Gas Hydrates.

UNIT V MISCELLANEOUS 12 hrs

Introduction to Strategic, Critical and essential minerals. National mineralpolicy, and their role in Nationaleconomy. Mineral based Industries in India.Geology, Mode of Occurrence and Origin of the raw materials of the followingIndustries: Refractory- Abrasives-paint and pigments-fertilizer glass, ceramicand cement industries.

Total no of hours: 60

TEXT BOOKS:

1. Bateman Allan, (1962)M. -Economic Mineral Deposits, Asian Publishing House, 2nd Edition.
2. Lindgren, W(1933). -Mineral Deposits, MCGraw Hill,

REFERENCES

1. Coggin, B. and Dey, A.K.(1955) - India's Mineral Wealth, oup.
2. Park, C.F. and Macdiarmid,(1970) R.A-re deposits, Freeman
3. Krishnaswamy ,S.(1979) - India's Mineral Resources, oxford and IBH.
4. Deb.S. (1980)- Industrial Minerals and Rocis of India, Allied.
5.Gokhale, K.V.G.K. and Rao,(1978.) T.C- Ore deposits of India, theirdistribution and processing, Thosmson press.

HBGE18013	HYDROGEOLOGY	L T P C 3 1 0 4

UNIT I INTRODUCTION 12 hrs

Scope- Utilization of Ground Water –Ground water in Hydrologic cycle.

UNIT II OCCURRENCE OF GROUND WATER 12 hrs

Origin of Ground water –Rock properties affecting ground water, vertical distribution of ground water, Geologic formations as aquifers, types of aquifers, Ground water basins, springs.

UNIT III GROUND WATER MOVEMENT 12 hrs

Darcy's law. Coefficient of permeability. Ground water flow rates. Permeability formulas. Laboratory measurement of permeability, Field measurement of permeability. Tracing ground water movement.
Exploration for Groundwater: Geological methods, Photo geology and Remote sensing techniques in ground water, Hydrologic methods –surface geophysical methods-test drilling-drilling and excavation equipments, Geologic logs, geophysical logs.

UNIT IV WATER WELLS 12 hrs

Methods of Constructing shallow wells –methods of drilling deep wells- Well completion-well development- testing wells for yield-sanitary protection of wells-maintenance and repair of wells-collector wells and infiltration gallery.

UNIT V WATER QUALITY 12 hrs

Dissolved constituents, suspended materials –classification of water Ground water in igneous, metamorphic and Sedimentary Rocks: metamorphic and plutonic igneous rocks, volcanic rocks, sedimentary rock types and bed thicknesses-Limestone caverns- Non indurated sediments – river valleys- Valleys of tectonic origin, Coastal plains –Regions of eolian deposits, glaciated terrain in-Regions of miscellaneous deposits.

Total no of hours: 60

TEXT BOOKS

1**.** Raghunath,H.M.(1987).Ground water. New Age International

REFERENCES

1.*Todd,D.K.(1980).Groundwater Hydrology.Wiley India,*

Department of Earth and Atmospheric Sciences

HBGE18014	APPLIED GEOLOGY	L T P C 4 0 0 4

UNIT I APPLIED GEOPHYSICS 12 hrs

Geophysical prospecting: Elementary principles of gravimetric, magnetic, electric, seismic and radioactive methods of geophysical prospecting, their application and limitations.

UNIT II ENGINEERING GEOLOGY 12 hrs

Engineering, Geology: The geological conditions necessary for dams, Reserve's, cuttings, Tunnels and Building foundations. Land slides and revetments, prevention of sea erosion and coastal protection.

UNIT III HYDROGEOLOGY 12 hrs

Ground water Geology-Hydrologic cycle-rock formations and their characteristics as a water containing strata-occurrence of ground water survey.

UNIT IV ENVIRONMENTAL GEOLOGY 12 hrs

Environmental Geology-outlines of geologic processes and their environmental implications- Earth Resources –removable and non-removable resources –Energy resources –mineral resources-Soils and water-Environmental impact of mineral extraction and processing case studies of some urban and rural areas.

UNIT V GEOLOGICAL PROSPECTING 12 hrs

Geological prospecting-Preliminary mapping-Detail mapping, surface indications of ore deposits-important method of prospecting of ore deposits. Geochemical prospecting basic principles, Geochemical anamolies-outlines of field laboratory procedures in mineral exploration-sampling, assay and Evaluation deposits.

Total no of hours: 60

TEXT BOOK

1.Parbin Singh(2009). Engineering and General Geology.S.K.Kataria and Sons.

2.Raghunath,H.M.(1987).Ground water. New Age International.

REFERENCES

1 .Dobrin,M.B.(1988). Introduction to Geophysical prospecting. McgrawHill.

Department of Earth and Atmospheric Sciences

HBGE18015	SOIL MECHANICS	L T P C 3 1 0 4

UNIT I **12hrs**

Physical properties of soils –identification and classification of soils-mechanical analysis-grain size distribution-consistency and plasticity characteristics-neutral and effective stresses in soils – permeability.

Site exploration, sampling and testing.

UNIT II **12hrs**

Shear strength of soils-bearing capacity of shallow footings in clay and sand soils effect of fluctuation of water table selection of type of foundation-spread foundations.

UNIT III **12hrs**

Stability of slopes-simple homogeneous cases.Compressibility of soils –theory of consolidation-settlement analysis.

UNIT IV **12hrs**

Lateral earth pressure phenomena-active and passive earth-pressure of cohesive and cohesion less soils-stability of retaining walls.

UNIT V Laboratory **12hrs**

Mechanical analysis-Liquid, Plastic and Shrinkage limits- Specific gravity- proctor compaction tests – Direct and unconfined shear tests-consolidation test.

Total no of hours: 60

TEXT BOOKS

1.Moorthy,V.N.S.(1999). A Text Book of Soil mechanics and Foundation engineering.UBS Publisher

REFERENCE

1.Gopal Ranjan and Rao,A.S.R.(1997).Basic and Applied Soil Mechanics.,Wiley Eastern.

HBGE18L06	FIELD GEOLOGY	L T P C 0 0 3 2

Students should be taken on a local field trip to study the elementary aspects of geomorphology, Palaeontological aspects and collection of fossils for about a week and submit a report thereon.

HBGE18L07	SOIL LAB	L T P C 0 0 3 2

Mechanical analysis-Liquid, Plastic and Shrinkage limits- Specific gravity- proctor compaction tests – Direct and unconfined shear tests-consolidation test.

TEXT BOOK

1. Soil Engineering Laboratory Instruction Manual Published by the Engineering College Co-operative Society, Chennai, 1996.

Total no of hours: 30

HBMG17G01	ENTERPRENEURIAL DEVELOPMENT	L T P C 3 0 0 3

UNIT I CONCEPT OF ENTREPRENEURSHIP 9hrs

Entrepreneurship-Meaning-types-qualities of an entrepreneur-classification of entrepreneur-Factors influencing entrepreneurship-functions of entrepreneurships.

UNIT II ENTREPRENEURIAL DEVELOPMENT AGENCIES 9hrs

Common Banks-District industries centre- National small industries corporation-small industries development organisation-small industries service institute, All India Financial Institutions-IDBI-IFCI-ICICI-IRDBI.

UNIT III PROJECT MANAGEMENT 9hrs

Business idea generation techniques-identification of business opportunities-feasibility study-marketing, finance, technology and legal formalities-preparation of project report-tools of appraisal

UNIT IV ENTREPRENEURIAL DEVELOPMENT PROGRAMMES 9hrs

Entrepreneurial Development Programmes(EDP)-Role ,relevance and achievements-role of government in organised EDPS-critical evaluation.

UNIT V ECONOMIC DEVELOPMENT AND ENTREPRENEURIAL GROWTH 9hrs

Role of Entrepreneurs in economic growth-strategic approaches in the changing economic scenario for small scale Entrepreneurs-Networking, Niche play, Geographic Concentration. Franchising/Dealership- Development of women Entrepreneurship.

Total no of hours: 45

REFERNCES:

1. *Dr.V.Balu-Entrepreneurial development*

2. Dr.P.T.Vijaytashree & Dr.M.Alagammai-Entrepreneurial development

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HBGE18016	REMOTE SENSING AND GIS	L T P C 3 1 0 4

UNIT I REMOTE SENSING 12Hrs

Definition – components of remote sensing – energy, sensor, interacting body - active and passive remote sensing – platforms – aerial and space platforms – balloons, helicopters, aircraft and satellites – synoptivity and receptivity – electro magnetic radiation (EMR) –EMR spectrum – visible, infra red (IR), near IR, middle IR , thermal IR andmicrowave – black body radiation - Planck's law – Stefan-Boltzman law.

UNIT II EMR INTERACTION WITH ATMOSPHERE AND EARTH MATERIALS 12Hrs

Atmospheric characteristics – scattering of EMR – Raleigh, MIE, non-selective and Raman scattering – EMRinteraction with water vapour and ozone – atmospheric windows – significance of atmospheric windows – EMR interaction with earth surface materials – radiance, irradiance, incident, reflected, absorbed and transmitted energy –reflectance – specular and diffuse reflection surface- spectral signature – spectral signature curves – EMR interaction with water, soil and earth surface

UNIT III OPTICAL AND MICROWAVE REMOTE SENSING 12Hrs

Satellites - classification – based on orbits – sun synchronous and geo synchronous – based on purpose – earth resource satellites, communication satellites, weather satellites, spy satellites – satellite sensors - resolution –spectral, spatial, radiometric and temporal resolution – description of multi spectral scanning – along and across track scanners – description of sensors in land sat, spot, irs series – current satellites - radar – speckle – back scattering – side looking airborne radar – synthetic aperture radar – radiometer – geometrical characteristics

UNIT IV GEOGRAPHIC INFORMATION SYSTEM 12Hrs

GIS – components of GIS – hardware, software and organizational context – data – spatial and non-spatial – maps –types of maps – projection – types of projection - data input – digitizer, scanner – editing – raster and vector data structures – comparison of raster and vector data structure – analysis using raster and vector data –retrieval, reclassification, overlaying, buffering – data output – printers and plotters

UNIT V MISCELLANEOUS TOPICS 12Hrs

Visual interpretation of satellite images – elements of interpretation - interpretation keys characteristics of digital satellite image – image enhancement – filtering – classification - integration of GIS and remote sensing – application of remote sensing and GIS – urban applications - integration of GIS and remote sensing – application of remote sensing and GIS – water resources – urban analysis – watershed management – resources information systems

Total no of hours: 60

TEXT BOOKS

1. Anji Reddy, Remote Sensing and Geographical Information Systems, B.S. Publications, New Delhi, 2001

2. M.G. Srinivas (edited by), Remote Sensing Applications, Nervosa Publishing House, New Delhi, 2001.

REFERENCES

1. Lillesand T.M. And Kiefer R.W. Remote Sensing And Image Interpretation, John Wiley And Sons, Inc, New York, 1987.

2. Janza.F.J., Blue, H.M., Johnston, J.E.., "Manual of Remote Sensing Vol.I American Society of Photogrammetry,Virginia, U.S.A, 1975.

3. Burrough P.A, Principle Of Gis For Land Resource Assessment, Oxford, 1990

Department of Earth and Atmospheric Sciences

HBGE18017	MINING GEOLOGY	L T P C 3 1 0 4

UNIT I **12hrs**

Introduction: Geology in Mining industry Definitions of mining terms.Boring: Uses of bore holes-hand boring-various methods of power boring (a) percussive (1) by solid rods (2) by ropes (b) Rotary diamond and calyx drilling. Examination of cores and logging. Bore hole surveying. Determination dip, strike and thickness of beds from bore holes.

UNIT II **12hrs**

Surface mining methods: open pit end allulial mining. Advantages and limitations of under ground Mining: Development working various stopping methods, their advantages and limitations, Elements of metal and coal mining methods. Relations of Geology to mining methods : Geological works at mines and quarries, control of structure wall rock and type of mineral deposits.

UNIT III **12hrs**

Sampling – Principles – types – collection of sample – core samples and their preservation. Drilling – brief account of different types of drilling – Geological logging of borehole samples.

UNIT IV **12hrs**

Methods of breaking rocks – A short note on explosives. Surface mining open cast. Alluvial mining: Panning – Sluicing – Hydraulicking – Dredging – mine support and stoping – shaft sinking.

UNIT V **12hrs**

Subsurface mining: Criteria to choose subsurface mining, Definition of mining terms: Shaft, Level, Adit, Hanging wall, Footwall, Drive, Cross cut, Tunnel, Raise, Winze and Chute. Stoping – Open stopes – Supported stopes – pillar – Square set filled – Shrinkage stopes, Glory hole mining. Caving methods: Top slicing, Sub level caving, Block caving, Coal mining, Prospecting and Planning – Strip mining – Augering – Room and Pillar method – Long wall method

Total no of hours: 60

TEXT BOOK

1. Arogyaswamy, R.N.P.(1996) Courses in Mining Geology – Oxford &IBH, New Delhi.

REFERENCES

1. *Deshmukh,D.J.(2010). Element of Mining Technology . Central Techno Publications*

HBGE18L08	PROFESSIONAL SKILLS II REMOTE SENSING AND GIS LAB	L T P C 0 0 3 2

1. Spectral reflectance observation of the following using spectro radiometer
   i) Vegetation. ii) Soil iii) Water.
2. Map reading of Survey of India topo sheets.
3. Visual interpretation of different satellite data and aerial photographs for the preparation of following;
   i) Land use/land cover map.
   ii) Geology and geomorphology maps.
   iii) Slope maps.
   iv) Watershed delineation.
4. Spatial Referencing and Rectification of Scanned Map
5. Database Creation and Onscreen Digitization
6. Projection and Reprojection of spatial data.
7. Data Conversion – V
   a. Vector to Raster, Raster to Vector
   b. Adding attribute data – querying on attribute data
   c. Generation of DEM: from contours, spot heights, GRID and TIN,
8. Isometric mapping
9. Vector Analysis – Buffering, Overlay and Network analysis,
10. Flood mapping
11. Raster Analysis – Measurement - Arithmetic overlaying,
12. Logical overlaying, Class interval selection, choropleth maps
13. Map Output - Bar charts, and located symbols

Total no of hours: 30

TEXT BOOKS

1. Curran, P (1988). Principles of remote sensing. Corgman Publishers,London .
2. Lillesand, T.M and R.W. Kiefer (2000). Remote sensing and image interpretation. John Wiley Sons, New York .
3. Miller, V.C (1961). Photogeology. McGraw-Hill Publishers, New York2020 4. Pandey, S.N (1987). Principles and applications of photogeology. WileyEastern Ltd.,New Delhi.
4. Sabins, F.F (1987). Remote sensing principles and interpretation. Freeman Publishers, New York.
5. Siegal, B.S and R. Gillespie (1980). Remote sensing in Geology, John Wiley & Sons, New York
6. Arogyaswamy, R.N.P.(1996) Courses in Mining Geology – Oxford &IBH, New Delhi.
7. Thamus, P.J. (1979) An introduction to mining, Methun.
8. Mc Kinstry, H.E (1960) Mining Geology, New york.

REFERENCES:

1. *Allum, J.A.E (1978). Photogeology and regional mapping, Pergamon Press Ltd., Oxford*
2. *Anji Reddy, M (2001). Textbook of remote sensing and GIS, BSP PS Publications, New Delhi*
3. *Rampal, K.K (1999). Handbook of aerial photography and interpretation. Concept Publishers Company, New Delhi*
4. *Jean Yves Scanvic (1997). Aerospatial remote sensing in geology. Oxford & IBH Publishers Co. Pvt. Ltd.*
5. *Agarwal, C.S and Garg, P.K (2000). Textbook on remote sensing in natural resources monitoring and management, Wheeler Publishing Company Ltd., New Delhi*
6. *Narayan, L.R.A (1999). Remote sensing and its application. Universities Press Ltd., Hyderabad.*

HBGE18L09	FIELD GEOLOGY AND PROJECT WORK	L T P C 0 0 20 10

Student should be taken to extensive field trip to study the fundamentals of rock and mineral formations from various mine fields and mountainous regions. Further to understand the structural mapping aspects of various stratigraphic sections of economic importance.

To guide the students such a way that the students carry out a comprehensive work on the chosen topic which will stand them in good stead as they face real life situations

The objective of project work is to enable the students to work in convenient groups of not more than four members in a group on a project involving field studies. Every project work shall have a guide who is a member of the faculty of the university.

Each student shall finally produce a comprehensive report covering background information, literature survey, problem statement, project work details and conclusions. This final report shall be typewritten form as specified in the guidelines.

The continuous assessment and semester evaluation may be carried out as specified in the guidelines to be issued from time to time.