



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)



ADIKAVI NANNAYA UNIVERSITY
RAJAHMAHENDRAVARAM

Syllabus for
Mudlogging (PG Diploma – 1 year)
(2020-21 AB onwards)

Department of Geology
University college of Science & Technology
Adikavi Nannaya University
Rajahmahendravaram – 533 296, A.P.,



**Minutes of Board of Studies in Geology
Held on 21.12.20, at 4 PM
Through on-line meeting**

As the University Grants Commission has given permission to offer PG Diploma in Mudlogging under NSQF, the Board of studies in geology has been convened to prepare the course structure and syllabi.

Agenda:

Preparation of Syllabi for Mudlogging program

Members
Prof. Y. Srinivasa Rao, Chairman
Dr. KN Ratnam, Head of the Department
Prof. KSN Reddy, Andhra University
Dr. K. Ratnakar, Nagarjuna Univ.,
Sri PVV Satyanarayana, GM-Area Manager, ONGC (Representing Sri. Vadiraj, Forward Basin Manager)
Dr. V. Balaram, former-CSIR Scientist, NGRI
Dr. KV Swamy, AKNU
Dr.KS Peter, AKNU
Dr. G. Apparao, AKNU
D. Teja, AKNU

Resolutions:

1. After having detailed discussion, the committee has resolved and approved the proposed course structure and syllabi.
2. The regulations for examination and evaluation will be as PG Science program of the university
3. In the first semester, field work on geological mapping and report and second semester, institutional/industrial or case-study review based project work, report preparation and presentation will be conducted.



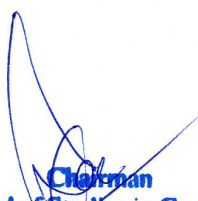
ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

PG Diploma in MUD LOGGING

AIM OF THE COURSE

The course provides the students with the basic skills and techniques needed to analyse and interpret the mudlogging data in the hydrocarbon exploration and development activities.

Knowledge and understandings:	<ul style="list-style-type: none">• Understanding the fundamentals and developments related to mudlogging as well as the related fields• Demonstrate the influence of professional practices of mud logging studies on the community and the environment.• Appreciate the principles and basics of quality control and its application in mud logging fields.
Intellectual Skills:	<ul style="list-style-type: none">• Assessing and interpreting mud logging information - with the unavailability of some data - for solving problems related to hydrocarbons applications• Integrate information from a variety of scientific fields for problem solving.• Learning scientific studies/reports in mud logging applications, considering the basics and ethics of scientific writing.• Distinguish the improvement of performance through planning, risk assessment and decision making in the practices of mud logging.
Professional Skills:	<ul style="list-style-type: none">• Application of advanced techniques and instrumentation in mudlogging problems.• Preparation of technical reports related to different mud logging applications for preparation of his/her research articles.
General skills	<ul style="list-style-type: none">• Application of tools and scientific resources effectively in different tasks related to mud logging applications.• Effective Team-work participation according to the rules, indicators and ethics with in time limits and self learning


Chairman
Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296



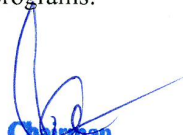
PG Diploma in MUD LOGGING

PROGRAM STRUCTURE

Sem	Paper no.	Paper Name	Theory /Lab	Hrs./ week	Credits	Max. Marks (Cont/ Internal Assessment)	Max. Marks University Exam	Total marks
			T/L/ F/P					
I	1	Basics in Rocks study	T	4	4	25	75	100
		Mineralogy and Petrology Lab	L	6	3	12	38	50
	2	Petroleum system	T	4	4	25	75	100
		Petroleum System lab	L	6	3	12	38	50
	3	Exploration Methods	T	4	4	25	75	100
		Exploration Methods Lab	L	6	3	12	38	50
	4	Field mapping & report preparation	F		10	0	200	200
	II	5	Wellsite geology	T	4	4	25	75
Wellsite Geology lab			L	6	3	12	38	50
6		Mudlogging and Mud Engineering	T	4	4	25	75	100
		Mud logging and Mud Engineering Lab	L	6	3	12	38	50
7		Formation Evaluation	F	4	4	25	75	100
		Formation Evaluation Lab	L	6	3	12	28	50
8		Industrial/institutional/ Case-study based Project work, report submission and Presentation	P		10	0	200	200
		Total			62		1300	

T: Theory, L: Lab, F: Field report: F, P: Project/industrial training

1. Student eligibility for joining in the course: MSc in Geology/Geophysics/Geosciences or B. Tech in Petroleum Engineering
2. Regulations for examination and evaluation are on par with PG Science programs.


Chairman
Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

MODEL QUESTION PAPER
Adikavi Nannaya University:: Rajahmundry
PG Diploma in Mudlogging
Semester:
Paper – ...: Title of the paper
(With effect from 2020-21 A.Y.,)

Time: 3 hours

Max Marks: 75

SECTION – A

Answer all the questions. Each question carries 15 marks (4 X 15M = 50M)

1. from Unit I
(OR)
2. from Unit I
3. from Unit II
(OR)
4. from Unit II
5. from Unit III
(OR)
6. from Unit III
7. from Unit IV
(OR)
8. from Unit IV

SECTION – B

Each question carries 3 marks (5 X 3M = 15M)
(Total 8 questions and at least TWO questions should be given from each unit)

9. Answer any 5 questions.
- a.
 - b.
 - c.
 - d.
 - e.
 - f.
 - g.
 - h.

Chairman
Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296



PG Diploma in Mudlogging: I Semester
(Effective from the Admitted Batch of 2020-21)

1. Basics in Rocks study

Unit-1: Definition of a mineral – Physical properties of minerals: Mohs scale of hardness – Structure and chemistry of Quartz, Feldspars, Mica Pyroxenes, Amphiboles, Garnet groups of minerals. Clay minerals.

Unit-2: Definition of Petrology – Differences among Igneous, Sedimentary and Metamorphic rocks. Origin and forms of Igneous rocks – textures – structures and classification of Igneous rocks. Types of Metamorphism - Textures and structures of Metamorphic rocks.

Unit-3: Origin and classification of sediment and sedimentary rocks ; Sedimentary textures - grain size scale, measurement, roundness, sphericity, shape and fabric; quantitative grain size analysis and interpretation;

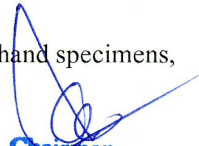
Unit-4: Classification of conglomerates, sandstones, mudstones and carbonate rocks; Sedimentary structures - Mechanical, chemical and biogenic. Sedimentary depositional environments. Types of Porosity and permeability and its importance

Text books:

1. Physical Geology: G. Gorshkov, A. Yakushova.
2. The Principle of petrology: G.W. Tyrell.
3. Rutleys mineralogy: H. M. Read.
4. Boggs Sam Jr.m1995: Principles of Sedimentology and Stratigraphy, Prentice Hall.
5. Sengupta S., 1997: Introduction to Sedimentology. Oxford-IBH
6. An Introduction to the rock forming minerals by W.A.Deer, R.A. Howie and J. Zussman
7. Dana's Text book of Mineralogy by W.E. Ford
8. Manual of Mineralogy by Klein, C. and Hurlbut, Jr.C.S
9. Descriptive Mineralogy by L.G. Berry and Mason.

Mineralogy and Petrology Lab:

- Megascopic and microscopic identification of important silicate and non-silicate minerals.
- Megascopic and microscopic study of igneous rocks.
- Megascopic and microscopic study of metamorphic rocks.
- Grain size analysis of sediments and its classification using trilinear diagram
- Sieve analysis and pipette analysis
- Graphical representation of grain-size data & textural analysis
- Study of primary, secondary and biogenic sedimentary structures in hand specimens, of photographic atlases and field photographs/outcrops.


Chairman
Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

Model Question Paper
Adikavi Nannaya University:: Rajahmundry
PG Diploma in Mudlogging – I Semester
Paper – I: Basics in Rock study
(With effect from 2020-21 A.Y.,)

Time: 3Hrs

Section – A

Max. Marks: 75
4 X 15M = 60

Each question carries 15 marks.

1. Give a detail note on Felspar group of minerals?
(OR)
2. Discuss the Physical properties of minerals?
3. Write about the types of metamorphism ?
(OR)
4. Explain the forms of igneous rocks ?
5. Discuss the Grain size analysis ?
(OR)
6. Explain the Sedimentary rock classification ?
7. Give a detail note on Sedimentary environments ?
(OR)
8. Write an essay on Classification of conglomerates ?

Section –B

5 X 3M = 15

Each question carries 3 mark

9. Answer any five of the following
 - a. Albite mineral physical properties
 - b. Quartz physical properties
 - c. Foliation
 - d. classification of sediment
 - e. Phacolith
 - f. Primary porosity
 - g. Limestone
 - h. Roundness

PG DIPLOMA

MUD LOGGING (20-21)

Page 7 of 17
Chairman
Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296



PG Diploma in Mudlogging: I Semester
(Effective from the Admitted Batch of 2020-21)

2. Petroleum system

Unit I: Definitions and Introduction to Petroleum system; History of Petroleum exploration and development; Physical and chemical properties of Petroleum; Occurrence of petroleum - pools, fields and provinces; Occurrence of Oil and gas in India and world; Source rocks and their Properties.

Unit II: Generation and migration of petroleum: Origin of petroleum, modern organic processes on earth surface - formation and maturation of kerogen, Diagenesis, Catagenesis, metagenesis - biogenic and thermal effect – paleo-thermometers - TTI concept

Unit III: Petroleum Migration and accumulation; Evaluation and analysis of kerogen and bitumen; Reservoir rocks - Properties, relationship between porosity, permeability and texture, effects of diagenesis on reservoir quality, reservoir continuity and characterization; Tilted OWC.

Unit IV: Traps and seals: Nomenclature of trap - distribution of petroleum in a trap, seals and cap rocks - classification of traps; cap rocks thickness vs. effectiveness; transgressive shales as cap rocks; Biomarkers source rock and oil correlation, oil and oil correlation using biomarkers. Petroleum reserves and estimation.

Petroleum system lab

- Study of cores
- Preparation of geological maps and sections, and derivation of geological history in relation to petroleum prospects;
- Calculation of oil and gas reserves; Exercises on maturation studies, source rocks and reservoir rocks
- Preparation of Stratigraphic cross sections, Development of stratigraphic panel (Fence) diagrams. Inter-tonguing diagrams.
- Structure contour map, location of oil and gas.
- Isopach and Isolith maps

Books recommended:

1. Elements of petroleum geology- RC. Selley, Stephen A. Sonnenberg - Academic Press (2014)
2. Petroleum Geology- North, F.K, Allen Unwin.- 1985
3. The Biomarker Guide (Vol.1 and 2) - Peters, K.E., Walters, C.C., Moldowan, J .M. (2005): Cambridge Univ. Press.
4. Petroleum geochemistry and geology (2nd Ed.) - Hunt, J.M. (1996) - Freeman, San Francisco.

Reference books

1. Tissot, B.P. and Welte, D.H. (1984): Petroleum formation and occurrence, Springer-Verlag.
2. Ravi Bastia, Geologic settings and petroleum Systems of India' east coast offshore basins- concepts and application.
3. Chandra, D. Singh, R.M and Sing M.P: 2000: Text book of Coal (Indian Context). Tara Book agency, Varanasi.
4. Kotur S. Narasimhan and A.K. Mukherjee; Gondwana coals of India; Allied publishers limited.
5. Applied Petroleum Geochemistry - Bordenave, M.L. (Ed.) (1993): Editions Technip, Paris.
6. Surface Geochemistry in Petroleum Exploration - S. A. Tedesco (1994), Springer-Verlag.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

Model Question Paper
Adikavi Nannaya University:: Rajahmundry
PG Diploma in Mudlogging – I Semester
Paper – II: Petroleum System
(With effect from 2020-21 A.Y.,)

Time: 3Hrs

Section – A

Max. Marks: 75
4 X 15M = 60

Each question carries 15 marks. Answer four questions

1. Discuss the history and development of petroleum exploration ?

or

2. What are the types of source rocks ? Give a note on their properties ?

3. Give in detail about the maturation of kerogen ?

or

4. Write a note on migration and accumulation of oil and gas ?

5. Discuss the effects of diagenesis on reservoir rock quality and character ?

or

6. Describe the procedure for evaluation and analysis of kerogen ?

7. Write an essay on Trap rocks ?

or

8. Discuss the role of biomarkers in petroleum studies ?

Section –B

5 X 3M = 15

Each question carries 3 marks.

9. Answer any five of the following

- a. Pool
- b. API
- c. Organic matter
- d. Kerogen
- e. Diagenesis
- f. Porosity
- g. Seal
- h. OWC

PG DIPLOMA

MUD LOGGING (20-21)

Page 9 of 17

Chairman
Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

PG Diploma in Mudlogging: I Semester
(Effective from the Admitted Batch of 2020-21)

9. Exploration methods

Unit -1 Geological Exploration: Geological criteria for hydrocarbons exploration. Methods of geological exploration. Field survey and mapping techniques - field equipment- methods of mapping geological map preparation - sampling pits and trenches -. Drilling and core logging. Preparation of technical report.

Unit-2 Electrical and Seismic methods: Geophysical exploration – principles of electrical resistivity and SP methods - interpretation – electrical logging methods in oil exploration. Seismic methods- refraction and reflection method- interpretation of seismic data- application- identification of geological structures-oil fields location- analysis of 3-D seismic data in oil exploration.

Unit-3 Magnetic and Gravity methods: Principles of Gravity and Magnetic methods – Corrections applied - field procedures – data processing and interpretation for hydrocarbon exploration. Principles of Remote sensing techniques and their applications in Hydrocarbon exploration

Unit-4 Geochemical & Radioactive methods: Geochemical prospecting- anomaly - background values- mobility of ions-associated elements - path finder elements like iodine - surface indicators - Gas – Geochemical application in hydrocarbon exploration. Radioactive method – Principles, methods, data analysis and interpretation. Applications in Hydrocarbon exploration.

REFERENCES:

1. Lahee, Field geology, CBS pub, New Delhi, 1987.
2. MB Dobrin, Geophysical prospecting, McGraw hill, New Delhi ,1981.
3. Mason, B., Introduction to geochemistry, John Wiley, USA, 1982.
4. Chaussier, J.B., and Mores, J Mineral Prospecting manual, North Oxford Academic press,1987.
5. Butler, B.C.M and Bell, J.D, interpretation of geological maps, Longman Scientific & technical Publ.,1st ED., New Delhi, 1988.
6. Principles of Geochemical prospecting – Gillsberg
7. Exploration Geophysics for Geologists and engineers – Bheemasnkaran and V K Gour
8. Geochemistry in Mineral Exploration – Rose, Hawks and Webb
9. Introduction to Geophysical prospecting – M B Dobrin
10. Manual of mineral exploration - Mis publ No 33 GSI
11. Principles and practices in mineral exploration - P K Ramam
12. Text book of Mineral exploration - Evans
13. Method of Geophysical exploration – T V ramachandra

EXPLORATION Methods Lab

Interpretation of field geophysical data – gravity, magnetic, Electrical and seismic in deciphering ground water, mineralized zone and construction site evaluation

PG Diploma in Mudlogging: I Semester
(Effective from the Admitted Batch of 2020-21)

4. Field mapping and Report preparation

The student has to do geological mapping selecting an area of study and submit a field report by preparing various maps and interpretation.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

Model Question Paper
Adikavi Nannaya University, Rajahmundry
PG Diploma in Hydrocarbons/Mud Logging, I Semester
Paper – III: Exploration methods
(Effective from the Admitted Batch of 2020-21)

Time: 3Hrs Max.

Marks: 75

Section – A

15 X 4 = 60

Each question carries 15 marks.

Answer four questions, choosing ONE from each Unit

1. Write in detail on geological parameters for mapping of hydrocarbon prospecting.
(OR)
2. Write an essay on coring, its types and handling procedures.
3. Write an essay role of Seismic survey in identification of oil & Gas.
(OR)
4. Explain the principle, procedures for Resistivity, Induced polarization and Self-potential methods.
5. Write an essay on concepts and magnetic surveying instruments.
(OR)
6. What is remote sensing, describe role of remote sensing hydrocarbon exploration.
7. Write an essay on geochemical prospecting and analytical methods.
(OR)
8. Write an essay on radioactive data analysis and interpretation.

Section –B

5 X 3 = 15


Each question carries 3 marks

9. Answer any five of the following,
- | | |
|----------------------------|-------------------------------------|
| a. Sampling pit & trenches | b. Base map |
| c. Reflection & refraction | d. Geophone |
| e. Proton magnetometer | f. Passive sensors & Active sensors |
| g. Pathfinder elements | h. Radioactive decay |

PG DIPLOMA

MUD LOGGING (20-21)

Page 11 of 17


Chairman
Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296



PG Diploma in Mudlogging: II Semester
(Effective from the Admitted Batch of 2020-21)

5. Well site Geology

Unit 1: Exploration strategy and well prognosis: sequence of search and exploration work, prognostication, classification and categorization of reserves, classification of drilling locations, economic analysis of an exploratory project – Duties and responsibilities of wellsite geologist: rig site information, wellsite materials and pre-well responsibilities - Well-program or Geo-technical order.

Unit 2: Drilling methods: cable tool, rotary, dyna, directional, pellet impact, simultaneous drilling methods and offshore drilling technology - Drilling fluids: function of drilling fluid, composition of drilling fluid, basic classification of drilling fluids, complications and important equations

Unit 3: Cuttings and its analysis: cuttings description and preparation of lithology, sample types and its shipping, cutting analysis - coring and core analysis: conventional and sidewall coring, core point selection, coring procedure, core retrieval and core packing, core analysis – lithology/striplog preparation, preparation and drafting of lithology, interpretation of lithology.

Unit 4: Casing and cementing: types of casing, casing accessories, running casing string, casing and cementation plan, cementing, annular leakages, channeling causes and preventive methods, use of centralizers, scratchers and turbulators - Factors influencing well completion methods, different methods of completion, perforation, well testing, workover programmes, well abandonment.

Wellsite geology Lab

1. Preparation of GTO
2. Well construction and design, Plotting of lithology and drilling time (litholog),
3. Calculation of lag time,
4. Study of drill cutting samples, conventional cores and side wall cores for lithology,
5. Plotting of inclinometer data and computation of vertical shortening and horizontal drift,
6. Identification of pay horizons through well site geological analysis,
7. Calculation of cement slurry volumes,
8. Determination of porosity of a sediment core sample

Text Books:

1. Formation evaluation and wellsite geological techniques, Bhagwan sahay, awadhesh rai and manoj kumar ghosh 1983, ONGC publication.
2. Wellsite geologist's handbook, Donald McPhater 1983, Pennwell corporation, 80pp.
3. The wellsite guide – an introduction to geological wellsite operations, Bernhard W. seubert, 1995, published on-line PT petroPEP Nusantara. ([https://www.petropep.com/download_1_html_files / The%20Wellsite%20Guide_new.pdf](https://www.petropep.com/download_1_html_files/The%20Wellsite%20Guide_new.pdf))



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

Model Question Paper
Adikavi Nannaya University:: Rajahmundry
PG Diploma in Mudlogging – II Semester
Paper – 5: Well site Geology
(With effect from 2020-21 A.Y.,)

Time: 3Hrs

Max. Marks: 75

Section – A

4 X 15M = 60

Each question carries 15 marks.
Answer ANY four questions

1. Discuss about the exploration strategies and economic analysis of an exploratory project?
or
2. Give a note on duties and responsibilities of wellsite geologist ?
3. Describe various methods of drilling methods in off shore ?
or
4. Write a note on functions of drilling fluids and its basic classifications ?
5. Describe the well cuttings and its analysis ?
or
6. Discuss various types of coring and coring procedure ?
7. Write in detail about the casing types, accessories and casing plans ?
or
8. Describe various methods of well completion ?

Section –B

5 X 3M = 15

Each question carries 3 marks

9. Answer any five of the following
 - a. Categorization of reserves
 - b. Pre-well responsibilities
 - c. Pellet impact
 - d. Complications in drilling fluids
 - e. Cuttings description for igneous rocks
 - f. Core packing
 - g. Channeling causes
 - h. Well testing

PG DIPLOMA

MUD LOGGING (20-21)

Page 13 of 17
Chairman

Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296



PG Diploma in Mudlogging: II Semester
(With effect from the Admitted Batch of 2020-21)

6. Mudlogging & Mud Engineering

Unit-1: Objectives and duties of Mud Logger: Mud-logging unit, users, personnel and their duties. Use of Mud logging for safety, efficiency and formation evaluation, outputs from ML unit. Rig up and rig down. Lag Time: Lag time and lag strokes, onshore and offshore differences, Lag time calculation and verification. Mud-logging Sensors: Data acquisition, Mud logging parameters, placement of sensors, principles of sensors as Depth, WHO, SPP, SPM, Torque, Flow out, Pit level, RPM, WHP, Mud resistivity, Mud weight, H₂S, HC Gas acquisition. Maintenance and calibration of equipment. Chart Interpretation and Monitoring: Instantaneous and lagged parameters, data presentation, monitoring drilling logging, interpretation of events from charts as tripping, circulation, drilling, kick, check of lag time, gas chart etc.

Unit-2: Sample collection: Different type of samples and methods of collection. Cutting Sample description: Type of samples, collection and packing of samples, Cutting description, fluorescence and cut. Calcimeter, flurimeter. Coring: Conventional and other coring methods, cleaning of core, marking and packing, transportation and storage of cores. Properties studied from cores, Preparation of core log.

Unit-3: Master Log & Well Report: Scales of log, plotting of different parameters, interpretative lithology, abbreviations, Descriptions and remarks. Hydrocarbon Gas: Physical properties of gas, terminology, coal gas, hydrates, porosity permeability and gas, terms for recorded as BG, TG, CG, peak gas, degasser, and gas-detection system, inferences from recorded gas, gas diagrams and ratios. Subsurface Pressures: Hydrostatic pressure, normal and over pressure, overburden, causes of overpressure, detection of over pressure, pressure log, kick indicators.

Unit-4: Mud Engineering: Fundamentals of Fluid flow (Fluid flow, viscosity), Types & Flow (Laminar, Turbulent). Criteria for the type of flow. Types of Fluids (Newtonian & Non-Newtonian), Viscometers. Mud Engineering: Functions of Drilling Mud, Types of Drilling muds (Water-base & Oil base) & their Chemical Additives. Mud Properties: Mud Weight, Rheological Properties, pH, Filtrate and filter cake. Mud Contaminants: NaCl, Anhydrite, Gypsum, and Cement. Conditioning equipment: Shale shaker, sand trap, degasser, de-sander and desilter. Under balanced Drilling: Equipment and process. Basics of Electronics and trouble-shooting for mudlogging sensors.

Mud logging and engineering Lab

1. Calculation of Pressure gradient using mud weight.
2. Hydrostatic Pressure calculations using mud weight and depth.
3. Conversions: Pressure into mud weight, specific gravity to mud weight, specific gravity to pressure gradient.
4. Hydrostatic Pressure calculations- while pulling wet and dry pipe out of hole.
5. Surge and Swab pressures during tripping.
6. Lag Time Calculation
7. Pit Gain calculations.
8. Calculations related to Drilling Fluids
9. Increased mud density/ reduce mud density. Mud weight calculation
10. Problems related to Mixing of fluids different densities.
11. Oil based mud calculations.
12. Oil/Water ratio calculations.
13. Uses of Computer in Mud logging & Mud Engineering.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

Model Question Paper
Adikavi Nannaya University, Rajahmundry
PG Diploma in Mud Logging, II Semester
Paper – 6: Mud-logging & Mud Engineering
(Effective from the Admitted Batch of 2020-21)

Time: 3Hrs Max.

Marks: 75

Section – A

15 X 4 = 60

Each question carries 15 marks.

Answer four questions, choosing ONE from each Unit

1. Define Mud logging, describe in detail about mud logging parameters.

(OR)

2. Write an essay on well-site operations, Kick detection parameters.

3. Write an essay on coring procedures and practices.

(OR)

4. Write an essay on drill cutting evaluation.

5. Write an essay on various types of gases encounter during drilling and its detection System.

(OR)

6. Define over pressure; describe the indicators and prevention of overpressure during drilling.

7. Write an essay on mud rheology.

(OR)

8. Write an essay on different types of pressures, causes of over pressures.

Section –B

5 X 3 = 15

Each question carries 3 marks

9. Answer any five of the following.

a. Lag time

b. H₂S

c. Calcimeter

d. Properties studied from cores

e. Hydrostatic pressure

f. Connection Gas & recycled gas.

g. Types of drilling muds.

h. Multimeter



PG Diploma in Mudlogging: II Semester
(Effective from the Admitted Batch of 2020-21)

7. Formation evaluation

UNIT-1: Petrophysical parameters – porosity - water saturation – permeability - formation factor - formation temperatures - resistivity index - formation factor porosity relationships; Borehole environment – distribution of resistivities around the borehole; Data acquisition - surface equipment – down hole equipment – tools – sensors – detector – signals; Open hole and cased hole operations - logging while drilling (LWD).

UNIT-2: Electrical logging: SP log, resistivity logging, conventional systems, focused systems, normal, lateral, laterolog, micro-logging devices, induction log; Porosity logs: Acoustic logging, bore hole compensation; Radioactive logging – Neutron & Density loggings, Gamma ray and Natural Gamma Ray Spectroscopy logs (NGS); Miscellaneous logs: dipmeter, Carbon-Oxygen logging, pulsed neutron log, cement bond and variable density log, NMR log.

UNIT-3: Determination of porosity from resistivity and non-resistivity porosity tools, density, neutron-sonic logs, lithology and porosity from cross-plots, determination of fluid saturation from resistivity porosity cross plots, permeability from logs, Quick look interpretation, identification of clean, shaly and hydrocarbon bearing zones, minerals, Complex reservoir and fractured reservoir interpretation, formation fluid sampling, MDT, RFT, sidewall casing.

UNIT-4: Production logging – fundamentals of production logging – applications – temperature, pressure, and radioactive tracer- applications; well completion techniques, perforation and tools for perforation; Applications of formation evaluation.

Formation Evaluation lab

1. Use of Porosity-Resistivity plots for estimation of water saturation.
2. Estimation of HC saturation using Archie's equation.
3. Estimation of Formation water salinity from SP log.
4. Use of Density-Neutron cross plots for lithology and porosity identification.
5. Shaly sand interpretation using cut offs for estimation of pay thickness (ϕ , S_w , V_{sh}).
6. Identification of fluids and contributing layers from flow meter and temperature logs.

Text Books

1. Formation evaluation by Edward J. Lynch
2. Fundamentals of well log interpretation – the acquisition of well log data by O. Serra, Elsevier Science Publishing company, Inc., New York.

Reference books:

1. Log interpretation principles/Applications, Schlumberger educational services, Texas, USA.

PG Diploma in Mudlogging: II Semester
(Effective from the Admitted Batch of 2020-21)

8. Institutional/Industrial/ case study review based project work

The student has to do a project either at institutional/institutional or case-study review, project report submission and presentation.



ADIKAVI NANNAYA UNIVERSITY :: RAJAHMAHENDRAVARAM
Syllabus (2020-21)

Model Question Paper
Adikavi Nannaya University:: Rajahmundry
PG Diploma in Mudlogging – II Semester
Paper – 7: Formation Evaluation
(With effect from 2020-21 A.Y.,)

Time: 3Hrs

Max. Marks: 75

Section – A

4 X 15M = 60

Each question carries 15 marks.
Answer four questions, choosing ONE from each Unit.

1. Discuss about the petrophysical parameters ?
or
2. Explain the openhole and cased hole operations and LWD ?
3. Describe briefly SP LOG ?
or
4. Give a note on nuclear logging ?
5. Explain various methods of determination of porosity from resistivity and non-resistivity tools ?
or
6. Discuss Quick look interpretation ?
7. Write about Production logging and also discuss the temperature log ?
or
8. Explain the logging and evaluation of coal bed methane ?

Section –B

3 X 5M = 15

Each question carries 3 marks

9. Answer any five of the following
 - a. Downhole equipment
 - b. Formation factor
 - c. Acoustic logging
 - d. Induction log
 - e. Applications of gamma ray log
 - f. Radio-active tracer
 - g. Resistivity index
 - h. Dip meter

PG DIPLOMA

MUD LOGGING (20-21)

Page 17 of 17

Chairman
Board of Studies in Geology
Adikavi Nannaya University
Rajahmahendravaram - 533296