

DEPARTMENT OF APPLIED GEOLOGY  
INDIAN SCHOOL OF MINES, DHANBAD



SYLLABUS  
FOR  
5-YEAR INTEGRATED M. SC. (TECH.) &  
3-YEAR M. SC. (TECH.)  
IN  
APPLIED GEOLOGY  
2006-2007

**Course structure for Five-year Integrated M. Sc. (Tech.) (Applied Geology)**  
(Effective from 2006-2007)

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>I</b>	<b>Theory</b>			
	HSC-11101	English for Science & Technology	3 – 1 – 0	07
	AMC-11101	Mathematics-I	3 – 1 – 0	07
	APC-11101	Physics-I	4 – 0 – 0	08
	ACC-11151	Chemistry-I	4 – 0 – 0	08
	FMD-11101	Engineering Materials (Section A)	2 – 0 – 0	04
	ACD-11102	Engineering Materials (Section B)	1 – 0 – 0	02
	MMC-11101	Engineering Graphics	1 – 6 – 0	08
	CMC-11301	Environmental Studies	3 – 0 – 0	06
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	MMC-11301	Workshop Practice	0 – 0 – 2	02
	ACC-11251	Chemistry-I	0 – 0 – 2/2	01
	APC-11201	Physics-I	0 – 0 – 2/2	01
		<b>Total</b>	<b>21 – 8 – 4</b>	<b>54</b>

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>II</b>	<b>Theory</b>			
	AMC-12101	Mathematics-II	3 – 1 – 0	07
	APC-12101	Physics-II	3 – 0 – 0	06
	AMD-12102	Computer Programming &	3 – 0 – 0	06
	CSD-12101	Information Technology	1 – 1 – 0	03
	MMC-12101	Electrical Technology	3 – 0 – 0	06
	EIC-12101	Electronics & Instrumentation	3 – 0 – 0	06
	MMC-12102	Engineering Mechanics	3 – 0 – 0	06
	HSC-12305	Value Education, HR and Environment	1 – 1 – 0	03
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	AMC-12202	Computer Programming	0 – 0 – 2/2	01
	MMC-12301	Workshop Practice II	0 – 0 – 2	02
	APC-12201	Physics-II	0 – 0 – 2/2	01
	MMC-12202	Electrical Technology	0 – 0 – 2/2	01
	MMC-12202	Engineering Mechanics	0 – 0 – 2/2	01
	EIC-12301	Electronics & Instrumentation	0 – 0 – 2/2	01
	SWC-12701	Co-Curricular Activity	0 – 0 – 0	03
		<b>Total</b>	<b>20 – 3 – 7</b>	<b>53</b>

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>III</b>	<b>Theory</b>			
	ACC-13120	Inorganic Chemistry	3 – 1 – 0	07
	ACC-13125	Physical Chemistry	3 – 1 – 0	07
	GLC-13101	Physical Geology and Introduction to Oceanography	3 – 1 – 0	07
	GLC-13102	Crystallography & Optical Mineralogy	3 – 0 – 0	06
	GLC-13103	Paleontology	3 – 0 – 0	06
	MSC-13351	Managerial Economics	3 – 0 – 0	06
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	ACC-13220	Inorganic Chemistry	0 – 0 – 2	02
	GLC-13202	Crystallography & Optical Mineralogy	0 – 0 – 2	02
	GLC-13203	Paleontology	0 – 0 – 2	02
		Total	<b>18 – 3 – 6</b>	<b>45</b>

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>IV</b>	<b>Theory</b>			
	GLC-14101	Structural Geology	3 – 0 – 0	06
	GLC-14102	Mineralogy	3 – 0 – 0	06
	GLC-14103	Igneous and Metamorphic Petrology	3 – 0 – 0	06
	GLC-14104	Introduction to Geochemistry	3 – 0 – 0	06
	AMC-14101	Numerical and Statistical Methods	4 – 0 – 0	08
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GLC-14201	Structural Geology	0 – 0 – 2	02
	GLC-14202	Mineralogy	0 – 0 – 2	02
	GLC-14203	Igneous and Metamorphic Petrology	0 – 0 – 2	02
	AMC-14201	Numerical and Statistical Methods	0 – 0 – 2	02
	GLC-14904	Geological Field work* (2 weeks)	0 – 0 – 0	02
	GLC-14505	Viva-voce	0 – 0 – 0	02
	SWC-14701	Co-Curricular Activity	0 – 0 – 0	03
		Total	<b>16- 0 - 8</b>	<b>47</b>

\* Geological Fieldwork during winter vacation with credit in IV<sup>th</sup> Semester.

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>V</b>	<b>Theory</b>			
	Core Courses			
	GLC-15101	Sedimentary Geology	3 – 0 – 0	06
	GLC-15103	Stratigraphy	3 – 0 – 0	06
	CSC-51101	Data structures and Algorithms	3 – 1 – 0	07
	ACC-31134	Analytical Chemistry	3 – 1 – 0	07
	MSC-15151	Industrial Psychology & Industrial Relation	3 – 0 – 0	06
	<b>Elective</b> (Courses – Any one of the two)			
	MSE-15152	Operation Research	2 – 1 – 0	05
	HSE-15144	Professional Communication	2 – 1 – 0	05
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GLC-15201	Sedimentary Geology	0 – 0 – 2	02
	ACC-31234	Analytical Chemistry (Lab 1)	0 – 0 – 2	02
	CSC -51201	Data structures and Algorithms	0 – 0 – 2	02
	Total			<b>17 – 3 – 6</b>

Sem.	Course No.	Courses	L T P	Credit Hr.	
<b>VI</b>	<b>Theory</b>				
	Core Courses				
	GPC-16101	General Geophysics	3 – 0 – 0	06	
	GLC-16101	Exploration Geology	3 – 0 – 0	06	
	GLC-16102	Economic Geology and Indian Mineral Deposits	3 – 1 – 0	07	
	GLC-16103	Elementary Engineering Geology & Hydrogeology	3 – 1 – 0	07	
	GLC-16104	Fossil fuels and Energy Resources	3 – 0 – 0	06	
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>				
	GLC-16201	Exploration Geology	0 – 0 – 2	02	
	GLC-16202	Economic Geology and Indian Mineral Deposits	0 – 0 – 2	02	
	GLC-16903	Geological Field studies* (2 weeks)	0 – 0 – 0	02	
	GLC-16504	Viva-voce	0 – 0 – 0	02	
	SWC-16701	Extra Curricular Activities	0 – 0 – 0	03	
	Total			<b>15 – 2 – 4</b>	<b>43</b>

\* Geological Field studies during winter vacation with credit in VI<sup>th</sup> Semester.

Sem.	Course No.	Courses	L T P	Credit Hr.	
<b>VII</b>	<b>Theory</b>				
	Core Courses				
	GLC-17101	Advanced Mineralogy and Geochemical Techniques	3 0 0	06	
	GLC-17102	Advanced Structural Geology	3 0 0	06	
	GLC-17103	Advanced Igneous Petrology	3 0 0	06	
	GLC-17104	Sedimentology	3 0 0	06	
	GLC-17105	Advanced Stratigraphy	4 0 0	08	
	GLC-17106	Geostatistics	3 1 0	07	
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>				
	GLC-17201	Geochemical Analysis	0 0 2	02	
	GLC-17202	Advanced Structural Geology	0 0 2	02	
	GLC-17203	Advanced Igneous Petrology	0 0 2	02	
	GLC-17204	Sedimentology	0 0 2	02	
	GLC-17206	Geostatistics	0 0 2	02	
	Total			<b>19 1 10</b>	<b>49</b>

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>VIII</b>	<b>Theory</b>			
	Core Courses			
	GPD-18101	Remote Sensing,	2 0 0	08
	GLD-18101	Geomorphology & GIS	2 0 0	
	GLC-18102	Advanced Metamorphic Petrology	3 0 0	06
	GLC-18103	Ore Geology	3 0 0	06
	GLC-18104	Micropaleontology & Vertebrate Paleontology	3 0 0	06
	GLC-18105	Geochemistry & Isotope Geology	3 0 0	06
	GLC-18106	Geotectonics	3 0 0	06
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GPD-18201	Remote Sensing &	0 0 2/2	02
	GLD-18201	Geomorphology	0 0 2/2	
	GLC-18202	Advanced Metamorphic Petrology	0 0 2	02
	GLC-18203	Ore Geology	0 0 2	02
	GLC-18204	Micropaleontology & Vertebrate Paleontology	0 0 2	02
	GLC-18501	Viva-Voce	0 0 0	02
	GLC-18903	Geological Mapping Training*	0 0 0	04
SWC-18701	Co-curricular Activity	0 0 0	03	
Total			<b>19 0 8</b>	<b>55</b>

\*Geological Mapping Training camps in soft and hard rock areas. Each of 15 days duration during winter vacation with credit in VIII<sup>th</sup> Semester.

Sem.	Course No.	Courses	L T P	Credit Hr.	
<b>IX</b>	<b>Theory</b>				
	Core Courses				
	GLC-19101	Hydrogeology	3 0 0	06	
	PEC-19151	Introduction to Reservoir Engineering and Development Technology	3 0 0	06	
	GLC-19102	Petroleum Geology	3 0 0	06	
	GLC-19103	Coal Geology & Nanotechnology in Geosciences	3 1 0	07	
	MEC-19151	Rock Mechanics	3 0 0	06	
	GPC-19101	Geophysical Exploration Methods	3 0 0	06	
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>				
	GLC-19201	Hydrogeology	0 0 2	02	
	GLC-19202	Petroleum Geology	0 0 2	02	
	GLC-19203	Coal Geology	0 0 2	02	
	MEC-19251	Rock Mechanics	0 0 2	02	
	GPC-19201	Geophysical Exploration Methods	0 0 2	02	
	<b>Total</b>			<b>18 1 10</b>	<b>47</b>

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>X</b>	<b>Theory</b>			
	Core Courses			
	GLC-10101	Engineering Geology	3 0 0	06
	GLC-10102	Advanced Exploration Geology & Mineral Economics	3 1 0	07
	MEC-10151	Mining Methods & Surveying	4 0 0	08
	FMC-10151	Mineral Beneficiation	3 0 0	06
	GLE-10111	Elective (Any one of the following)	3 0 0	06
	GLE-10111- GLE-10118	(11) Applied Sedimentology, (12) Environmental Geochemistry, (13) Geotechnical Engineering, (14) Organic Geochemistry in Hydrocarbon Exploration, (15) Nuclear Geology, (16) Precambrian Geology, (17) Thermodynamics in Geological Systems, (18) Urban Geology.		
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GLC-10201	Engineering Geology	0 0 2	02
	GLC-10202	Advanced Exploration Geology & Mineral Economics	0 0 2	02
	MEC-10251	Mining Methods & Surveying	0 0 2	02
	FMC-10251	Mineral Beneficiation	0 0 2	02
	GLC-10601	Economic Geology Excursion (2 weeks)	0 0 0	02
	GLC-10802	Dissertation (Field work, Lab work and Seminar)*	0 0 4	08
	GLC-10503	Composite Viva-voce	0 0 0	02
	SWC-10701	Co-curricular Activity	0 0 0	03
<b>Total</b>			<b>16 1 12</b>	<b>56</b>

\* Economic Geology Excursion and dissertation fieldwork of 15 days duration each during winter vacation with credit in X<sup>th</sup> Semester.

**Course structure for Three-year M. Sc. Tech (Applied Geology)**

*(Effective from 2006-2007)*

Sem.	Course No.	Courses	L T P	Credit Hr.	
<b>I</b>	<b>Theory</b>				
	Core Courses				
	GLC 21101	Advanced Mineralogy and Geochemical Techniques	3 0 0	06	
	GLC 21102	Advanced Structural Geology	3 0 0	06	
	GLC 21103	Advanced Igneous Petrology	3 0 0	06	
	GLC 21104	Sedimentology	3 0 0	06	
	GLC 21105	Advanced Stratigraphy	4 0 0	08	
	GLC 21106	Geostatistics	3 1 0	07	
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>				
	GLC 21201	Geochemical Analysis	0 0 2	02	
	GLC 21202	Advanced Structural Geology	0 0 2	02	
	GLC 21203	Advanced Igneous Petrology	0 0 2	02	
	GLC 21204	Sedimentology	0 0 2	02	
	GLC 21206	Geostatistics	0 0 2	02	
	Total			<b>19 1 10</b>	<b>49</b>

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>II</b>	<b>Theory</b>			
	Core Courses			
	GPD 22101	Remote Sensing,	2 0 0	08
	GLD 22101	Geomorphology & GIS	2 0 0	
	GLC22102	Advanced Metamorphic Petrology	3 0 0	06
	GLC22103	Ore Geology	3 0 0	06
	GLC22104	Micropaleontology & Vertebrate Paleontology	3 0 0	06
	GLC22105	Geochemistry & Isotope Geology	3 0 0	06
	GLC22106	Geotectonics	3 0 0	06
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GPD 22201	Remote Sensing &	0 0 2/2	02
	GLD 22201	Geomorphology	0 0 2/2	
	GLC22202	Advanced Metamorphic Petrology	0 0 2	02
	GLC22203	Ore Geology	0 0 2	02
	GLC22204	Micropaleontology & Vertebrate Paleontology	0 0 2	02
	GLC22501	Viva-Voce	0 0 0	02
GLC22903	Geological Mapping Training*	0 0 0	04	
SWC22701	Co-curricular Activity	0 0 0	03	
Total			<b>19 0 8</b>	<b>55</b>

\*Geological Mapping Training camps in soft and hard rock areas. Each of 15 days duration during winter vacation with credit in II<sup>nd</sup> Semester.

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>III</b>	<b>Theory</b>			
	Core Courses			
	GLC23101	Hydrogeology	3 0 0	06
	PEC23151	Introduction to Reservoir Engineering and Development Technology	3 0 0	06
	GLC23102	Petroleum Geology	3 0 0	06
	GLC23103	Coal Geology & Nanotechnology in Geosciences	3 1 0	07
	MEC 23151	Rock Mechanics	3 0 0	06
	GPC23101	Geophysical Exploration Methods	3 0 0	06
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GLC23201	Hydrogeology	0 0 2	02
	GLC23202	Petroleum Geology	0 0 2	02
	GLC23203	Coal Geology	0 0 2	02
	MEC 23251	Rock Mechanics	0 0 2	02
	GPC23201	Geophysical Exploration Methods	0 0 2	02
	<b>Total</b>			<b>18 1 10</b>

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>IV</b>	<b>Theory</b>			
	Core Courses			
	GLC24101	Engineering Geology	3 0 0	06
	GLC24102	Advanced Exploration Geology & Mineral Economics	3 1 0	07
	MEC24151	Mining methods & Surveying	4 0 0	08
	FMC24151	Mineral Beneficiation	3 0 0	06
	GLE24111	Elective (Any one of the following)	3 0 0	06
	GLE24111- GLE24118	(11) Applied Sedimentology, (12) Environmental Geochemistry, (13) Geotechnical Engineering, (14) Organic Geochemistry in Hydrocarbon Exploration, (15) Nuclear Geology, (16) Precambrian Geology, (17) Thermodynamics in Geological Systems, (18) Urban Geology.		
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GLC24201	Engineering Geology	0 0 2	02
	GLC24202	Advanced Exploration Geology & Mineral Economics	0 0 2	02
	MEC24251	Mining methods & Surveying	0 0 2	02
	FMC24251	Mineral Beneficiation	0 0 2	02
	GLC24601	Economic Geology Excursion (2 weeks)	0 0 0	02
	GLC24802	Dissertation (Field work, Lab work and Seminar)*	0 0 4	08
GLC24503	Composite Viva-voce	0 0 0	02	
SWC24701	Co-curricular Activity	0 0 0	03	
<b>Total</b>			<b>16 1 12</b>	<b>56</b>

\* Economic Geology Excursion and dissertation fieldwork of 15 days duration each during winter vacation with credit in IV<sup>th</sup> Semester.

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>V</b>	<b>Theory</b>			
	Core Courses			
	GLC25101	Structural Methods in Exploration	3 0 0	6
	GLC25102	Computer Applications in Geology	3 0 0	6
	GLC 25103	Environmental Geology	3 0 0	6
	MMC25156	Elements of Drilling	3 0 0	6
	MSC25151	Industrial Management	3 0 0	6
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GLC25201	Structural Methods in Exploration	0 0 2	2
	GLC25202	Computer Applications in Geology	0 0 4	4
	GLC25801	Lab work / Dissertation	0 0 0	10
	Total	<b>15 0 6</b>	<b>46</b>	

Sem.	Course No.	Courses	L T P	Credit Hr.
<b>VI</b>	<b>Theory</b>			
	GLC26101	Sequence Stratigraphy and Basin analysis	3 0 0	6
	GLC26102	Coal Bed methane and Gas hydrate Exploration	3 0 0	6
	GLC26103	Contaminant Hydrogeology	3 0 0	6
	<b>Practical/Project/Seminar/Dissertation/Viva-voce</b>			
	GLC26401	Seminar (on Special Topic)	0 0 0	2
	GLC26802	Dissertation (Field work, Lab work & Thesis)*	0 0 0	20
	GLC26803	Dissertation Seminar	0 0 0	2
	GLC26504	Grand Viva Voce	0 0 0	5
	SWC26701	Co-curricular Activity	0 0 0	03
		Total	<b>9 0 0</b>	<b>50</b>

\* Dissertation fieldwork/Labwork of 6 weeks duration during winter vacation with credit in 6th Semester.