



# NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA

Programme for B.Tech./ B.Arch./ M.Tech. Dual/ I.Msc./ M.Sc./ MA/ MBA/ M.Tech./ M.Tech(R)/ Ph.D.

END SEMESTER EXAMINATION (2013-2014)

11-APR-2014

Day 1 : Date / Day of Examination : 23-APR-2014 ( Wednesday )

FIRST SESSION ( 7.00 AM to 10.00 AM )		
Sl.No	Subject Code	Subject Name
1	BM390	Special Topics in Biotechnology and Medical Engineering (Biotechnology in Human Health)
2	BM612	Advanced Biomedical Instrumentation
3	BM652	Advanced Biochemical Engineering
4	CE214	Theory of Elasticity
5	CH338	Industrial Instrumentation and Process Control
6	CR249	Materials Science and Engineering
7	CR654	Sintering and Microstructure
8	CY611	Advanced Analytical Chemistry
9	EC440	Soft Computing Techniques
10	HS321	Organizational Behaviour.
11	HS331	Sociology: The Science of Praxis
12	HS350	Contemporary Dance
13	HS418	Language and Writing
14	HS601	Linguistics
15	HS604	Advanced Developmental and Cultural Psychology
16	HS605	Organizational Dynamics
17	HS606	Developing and Managing Human Resources
18	HS608	Social Change
19	ID350	Robotics and Automation
20	LS538	Man and Microbes
21	LS701	Research methodology
22	MA610	Real Analysis
23	MA619	Functional Analysis
24	ME300	Finite Element Analysis
25	ME450	Computational Fluid Dynamics and Heat Transfer
26	ME611	Vibration Analysis and Diagnostics
27	ME632	Machine Tool Technology
28	ME652	Heat Transfer-II: Convection Heat Transfer
29	MM318	Principles and Practice of Heat Treatment
30	MN602	Mine Management

SECOND SESSION ( 10.30 AM to 1.30 PM )		
Sl.No	Subject Code	Subject Name
1	BM318	Medical Instrumentation
2	BM429	Materials in Medical Science
3	CE302	Disaster Management
4	CE610	Structural Dynamics and Earthquake Engineering
5	CE622	Stability Analysis of Slopes, Dams and Embankments
6	CE640	Analysis and Structural Design of Pavements
7	CE651	Hydrologic Element and Analysis
8	CH228	Treatment of Industrial Effluents
9	CH418	Recent Separation Technologies
10	CH632	Advanced Process Control
11	CR339	Ceramics in Electronic Applications
12	CS326	Data Communication and Computer Networks
13	CS333	Operating Systems
14	CS442	Computer System Architecture
15	CS610	Software Design
16	CS638	Pattern Recognition
17	CY202	Kinetics and Photochemistry
18	CY325	Introduction to Supramolecular Chemistry
19	CY431	Chemistry of Nanomaterials
20	EC200	Fundamentals of Communication Systems
21	EC320	Embedded Systems
22	EC624	Embedded Computing Systems
23	EE208	Advanced Electrical Engineering
24	EE308	Utilization of Electrical Energy
25	EE612	Advanced Machine Drives
26	EE636	System Identification and Adaptive Control
27	EE642	Wireless Communication
28	HS327	Cognitive Science
29	HS328	Sports Psychology
30	ID639	Applied Ergonomics

31	PH341	Treatise of Einstein Work and Beyond
32	PH352	X-Ray Techniques For Structure Evaluation
33	PH602	Problems in Quantum Physics
34	PH607	Problems in Condensed Matter Physics
35	SM502	Human Resource Management
36	SM602	Business Ethics and Corporate Governance

31	MA311	Linear Algebra
32	ME430	Industrial Management
33	ME436	Entrepreneurship
34	MM358	Experimental Techniques in Materials Engineering
35	MM448	Advanced Engineering Materials
36	MM612	Phase Transformation
37	MM666	Computational Modeling of Materials
38	PH312	Physics of Quantum World
39	PH351	Science of Nanomaterials

**Day 2 : Date / Day of Examination : 24-APR-2014 ( Thursday )**

<b>FIRST SESSION ( 7.00 AM to 10.00 AM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM312	Biomedical Instrumentation
2	BM352	Biochemical Engineering
3	BM624	Surface Engineering of Medical Implants
4	BM654	Advanced Bioseparation
5	CE312	Design of Steel Structures
6	CH312	Transport Phenomena
7	CR310	Refractories Technology
8	CR420	Glass-Ceramic Technology
9	CR622	Glass and Glass Ceramic for Technical Application
10	CR624	Advanced Glasses
11	CS312	Systems Analysis and Design
12	CS412	Software Engineering
13	CS612	Software Engineering
14	CY313	Natural Products
15	CY322	Basic Inorganic Chemistry-I
16	CY512	Structure and Functions of Biomolecules
17	CY617	Special Topics in Organic Synthesis
18	EC100	Basic Electronics Engineering
19	EC312	Electromagnetic Theory
20	EE100	Basic Electrical Engineering
21	EE312	Switch Gear and Protective Devices
22	EE734	Superconducting Magnets and Devices
23	HS500	Research Methodology
24	ID312	Product Design - II
25	LS403	Immunology
26	LS708	Advanced immunology
27	LS722	Marine biotechnology
28	LS730	Food and Bioprocess Technology
29	MA402	Measure Theory
30	MA622	Sampling Techniques with Applications
31	ME330	Metal Cutting and Tool Design
32	ME612	Non-Traditional Parameter in Design
33	ME633	Modern Manufacturing Processes
34	ME653	Computational Fluid Dynamics
35	MM324	Steel Making
36	MN330	Mine Ventilation
37	MN400	Mine Planning
38	MN633	Mine Fires and Spontaneous Heating

<b>SECOND SESSION ( 10.30 AM to 1.30 PM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM391	Special Topics in Biotechnology and Medical Engineering – I
2	CE418	Probability Methods in Civil Engineering
3	CE628	Earth Retaining Structures
4	CE642	Traffic Engineering and Traffic Flow Theory
5	CE650	Hydrology and Hydraulics of Surface & Sub-surface Water
6	CE655	Computational Fluid Dynamics
7	CH426	Coal Processing Technology
8	CH626	Nano Science and Technology
9	CS615	Software Testing
10	CS620	Software Testing
11	CY514	Environmental Chemistry
12	EC439	Advanced Process Control
13	EC444	Soft Computing
14	EC626	Low Power VLSI Design
15	EC644	Soft Computing
16	EE622	Advanced Power Electronic Converters
17	EE628	Industrial Process Automation
18	EE654	Satellite Communication
19	HS534	Natural Resource Management and Sustainable Development
20	HS610	Research Methodology
21	ID444	Design for Manufacture and Assembly
22	ID651	Product Design for Manufacturing and Assembly
23	LS511	Genetics
24	LS706	Advanced molecular biology
25	LS725	Biophysics
26	MA202	Mathematics - IV
27	MA502	Functional Analysis
28	ME604	Advanced Mechatronics
29	MM416	Complex Ferrous and Non-Ferrous Alloys
30	MM619	Physical Metallurgy of Alloy Steels
31	MM622	Steel Making
32	MM642	Advances in Material Science and Engineering
33	PH605	Experimental Techniques in Physics
34	PH662	Superfluidity and Superconductivity
35	SM614	Customer Relationship Management

39	PH402	Numerical Techniques in Physics
40	PH638	Special Topics in Condensed Matter Physics - I
41	SM504	Production & Operations Management

**Day 3 : Date / Day of Examination : 25-APR-2014 ( Friday )**

<b>FIRST SESSION ( 7.00 AM to 10.00 AM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM314	Biomedical Image Processing
2	BM354	Bioseparation
3	BM634	Advanced Biomechanics
4	BM642	Biophysics & Structural Biology
5	CE322	Geotechnical Engineering
6	CH628	Advanced Environmental Biotechnology
7	CR322	Glass Technology
8	CR610	Advanced Refractories
9	CS102	Data Structures and Algorithm
10	CS334	Operating Systems Design
11	CY323	Basic Inorganic Chemistry - II
12	CY522	Chemistry of Transition and Non-transition Elements
13	CY624	Special Topics in Inorganic Chemistry
14	EC314	Digital Communication
15	EC334	Instrumentation Devices
16	EE322	Control System - I
17	HS533	Developmet: Social, Antropoligical and political Perspective
18	HS612	Environment and Society
19	LS404	Molecular Biology and Biotechnology
20	LS505	Food Processing Technology
21	LS530	Aquatic Biology and Marine Biotechnology
22	LS531	Epigenetics
23	LS536	RNAi, Stem cells & Oncogenomics
24	LS705	Advanced microbiology
25	LS711	Bioinformatics
26	LS729	Biofuels
27	MA324	Number Theory
28	MA404	Functions of a Complex Variable
29	MA624	Advanced Statistical Methods
30	ME352	Fluid Dynamics and Hydraulic Machines
31	ME605	Advanced Decision Modeling Technique
32	ME616	Fatigue and Fracture of Engineering Components
33	ME656	Gas Turbines and Jet Propulsion
34	ME710	Advanced Composites
35	MM314	Heat Treatment of Metallic Materials
36	MN322	Geomechanics

<b>SECOND SESSION ( 10.30 AM to 1.30 PM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM254	Bioprocess Calculation
2	BM432	Biomicrofluidics
3	CE252	Fluid Mechanics
4	CE452	Water Resources Engineering
5	CE614	Advanced Reinforced Concrete Design
6	CE644	Planning and Design of Airports
7	CE652	Open Channel Flow
8	CE657	Water Quality Modeling and Management
9	CH226	Fuels and Combustion
10	CH428	Disaster Management in Chemical Industries
11	CH612	Computational Transport phenomena
12	CS242	Computer Organization and Architecture
13	CS431	Compiler Design
14	CS642	Cluster and Grid Computing
15	CY234	Basic Physical Chemistry - II
16	CY519	Methods in Organic Synthesis
17	EC202	Digital Electronics
18	EC424	Embedded Computing System
19	EC612	Antenna Analysis and Synthesis
20	EC622	Analog & Mixed Mode VLSI
21	EC639	Advanced Process Control
22	EC652	Video Signal Processing
23	EE242	Digital Electronics and Microprocessor
24	EE632	Modeling and Control of Power Conveters
25	EE644	Antenna Synthesis and Analysis
26	HS544	Environment and Development
27	ID222	Geometric and Solid Modeling
28	ID434	Photo Communication
29	ID665	Rapid Prototyping and Tooling
30	LS411	Biophysics
31	MA208	Analysis – I
32	MA551	Numerical Analysis
33	ME230	Primary Production Processes
34	ME434	Computer Graphics for CAD/CAM
35	ME453	Energy Conservation and Waste Heat Recovery
36	ME601	Optimization Method in Engineering Design
37	MM227	Fuel Technology
38	MM446	Composite Materials

37	PA102	Introduction to Architecture
38	PH304	Introduction to Mechanics
39	PH404	Electrodynamics
40	PH651	Crystal Symmetry and Crystal Physics
41	PH654	Physics of Thin Film Technology
42	SM506	Financial Management

39	MM638	Mechanical Working of Materials
40	MN205	Mineral Exploration
41	MN632	Environmental Management
42	PH538	Special Topics in Condensed Matter Physics - I
43	SM618	Industrial and Services Marketing

**Day 4 : Date / Day of Examination : 28-APR-2014 ( Monday )**

<b>FIRST SESSION ( 7.00 AM to 10.00 AM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM322	Biomechanics
2	BM332	Biomechanics
3	BM632	Computational Fluid Dynamics in Bioengineering
4	BM682	Special Topics in Biotechnology and Medical Engineering - II
5	CR320	Science of Sintering
6	CR620	Industrial Glass Making
7	CS332	Algorithm Analysis and Design
8	CY532	Chemical Kinetics and Photochemistry
9	CY636	Special Topics in Physical Chemistry
10	EC332	Electronic Instrumentation
11	EE324	Power Electronics
12	ID344	Design of Production Tooling
13	LS410	Food Science
14	LS581	Cancer biology
15	LS707	Structural basis of cell signaling
16	LS713	Microbial genetics
17	LS721	Bioethics and Intellectual Property Right
18	LS726	Molecular Biophysics
19	MA102	Mathematics - II
20	MA517	Lie Algebra
21	MA652	Statistical Inference
22	ME602	Robotics
23	ME621	Analytical Methods in Rotor Dynamics
24	ME637	Production System and Computer Integrated Manufacturing
25	ME662	Thermal Processes in Surface Engineering
26	ME760	Vacuum Technology
27	MN313	Underground Mining Technology
28	MN605	Rock Slope Technology
29	PA104	Building Materials
30	PH302	Properties of Matter
31	PH406	Condensed Matter Physics
32	PH669	Special Topics in Low Temperature Physics – II
33	SM508	Quantitative Techniques and Operations Research
34	SM638	Strategic Human Resource Management

<b>SECOND SESSION ( 10.30 AM to 1.30 PM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM244	Cell and Molecular Biology
2	BM444	Structural Biology
3	CE212	Structural Analysis
4	CE412	Pre-stressed Concrete
5	CE618	Pre-Stressed Concrete
6	CE626	Rock Mechanics
7	CE646	Evaluation and Strengthening of Pavements
8	CE654	Hydraulic Structures and Hydropower Engineering
9	CH212	Fluid Dynamics
10	CH330	Petroleum Refinery Engineering and Petrochemicals
11	CH434	Project Engineering
12	CH616	Advanced Fluidization Engineering
13	CR230	Science of Ceramic Materials
14	CS222	Database Management Systems
15	CS435	Artificial Intelligence
16	CS641	Advanced Computer Architecture
17	CY524	Group Theory And Molecular Orbitals
18	EC412	Antenna Analysis and Synthesis
19	EC430	Industrial Electronics and Instrumentation
20	EC637	Medical Instrumentation
21	EC654	Statistical Signal Processing
22	EC662	Communication Networks
23	EE202	Electrical Engineering
24	EE240	Measurement and Instrumentation
25	EE407	Electric Drives
26	EE606	Transient in Power Systems
27	EE626	Non linear Control Systems
28	EE668	Instrumentation and Sensors
29	HS532	Planning and Policy:Issues in India
30	ID232	Art and Aesthetic Design
31	ID442	Rapid Product Development Technologies
32	ID661	Analysis and Design of Mechanical Systems
33	MA206	Introduction to Complex Analysis and Partial Differential Equations
34	ME414	Mechatronics
35	MM220	Unit Process of Extraction
36	MM352	Material Characterization Techniques

37	MM468	Joining of Metals
38	MM652	Experimental Techniques in Materials Engineering
39	MM655	Transport Phenomena
40	MN204	Mining Machinery
41	PH554	Physics of Thin Film Technology
42	SM626	Mergers and Acquisitions



<b>FIRST SESSION ( 7.00 AM to 10.00 AM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM316	Biosensors and Biotransducers
2	BM614	Biomedical Image Processing
3	BM644	Advanced Cell & Molecular Biology
4	CE318	Finite Element Method
5	CH336	Chemical Engg. Mathematics
6	CR336	Cement Technology
7	CR346	Nanoceramics
8	CR426	Tribology of Materials
9	CR446	Thin Film and Coating
10	CS336	Digital Signal Processing
11	CY538	Molecular Spectroscopy
12	CY543	Molecular Rearrangement
13	CY616	Nuclear Magnetic Resonance Spectroscopy
14	EC322	Embedded Systems
15	EE356	Digital Signal Processing
16	HS542	Poverty, Inequality and Human Development
17	ID352	Industrial Robotics
18	LS423	Advanced Techniques
19	LS727	Advance Techniques
20	LS728	Food Microbiology
21	MA326	Statistical Methods
22	MA521	Combinatorics
23	ME354	Refrigeration and Air-Conditioning
24	ME623	Design of Tribological Elements
25	ME648	Quality Engineering and Reliability
26	ME657	Computational Methods in Thermal Engineering
27	ME711	Fundamentals of Tribology
28	MM357	Corrosion and Degradation of Materials and Their Prevention
29	MN600	Mine Planning
30	MN604	Advanced Mine Planning
31	PA106	Architectural Design Principles
32	PH102	Physics II
33	PH408	Quantum Mechanics - II
34	SM510	Economics and Legal Environment

<b>SECOND SESSION ( 10.30 AM to 1.30 PM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM202	Clinical Science
2	BM232	Biofluid Mechanics
3	CE202	Surveying
4	CE421	Ground Improvement Techniques
5	CE612	Stability of Structures
6	CE620	Ground Improvement Techniques
7	CE658	Advances in Remote Sensing and GIS
8	CE664	Advances in Remote Sensing and GIS
9	CH220	Chemical Engg. Thermodynamics
10	CH422	Simulation Modeling and Optimisation of Chemical Process
11	CH623	Environmental Management System
12	CR244	Introduction to Engineering Materials
13	CR248	Fuels, Furnace and Stoichiometry
14	CR652	Applications of Phase Diagrams in Ceramic Industries
15	CS213	Principles of Programming Languages
16	CS622	Design of Computer Networks
17	CS626	Intrusion Detection Systems
18	CY526	Bio-inorganic Chemistry
19	CY536	Colloids and Surface Chemistry
20	EC204	Semiconductor Devices
21	EC443	Digital Image Processing
22	EC627	VLSI Technology
23	EC630	Industrial Electronics and Instrumentation
24	EC656	Data Compression
25	EE404	Renewable Energy Systems
26	EE604	Flexible AC Transmission Systems
27	EE664	Embedded Computing Systems
28	ID658	Mechatronics and MEMS
29	MA546	Differentiable Manifolds
30	ME210	Design of Machine Elements
31	MM212	Casting and Solidification of Materials
32	MM435	Fracture Mechanics and Failure Analysis
33	MM648	Composite Materials
34	MN202	Mine Surveying
35	MN332	Remote Sensing and Its Application
36	PH202	Electricity and Magnetism
37	PH569	Special Topics in Low Temperature Physics-II

38	SM622	Financial Options, Futures and Swap
39	SM632	Performance Management

FIRST SESSION ( 7.00 AM to 10.00 AM )		
Sl.No	Subject Code	Subject Name
1	CE342	Transportation Engineering
2	CH334	Process Dynamics and Control
3	CR212	Ceramic Processing
4	CR612	Refractories for Metallurgical and Allied Processes
5	CR662	Ceramics in Energy Sectors
6	CY214	Basic Organic Chemistry - I
7	CY232	Chemical Kinetics
8	EC661	Advance Wireless Communication
9	EC762	Advanced Wireless Communication
10	EE204	Electro Magnetic Fields
11	HS523	Educational Psychology
12	HS546	Population Dynamics and Development
13	HS549	Public Economics
14	LS731	RNA Interference
15	ME350	Heat Transfer
16	MN321	Rock Mechanics
17	MN435	Eco-friendly Mining
18	PH667	Low Temperature Properties of Matter
19	SM512	Technology and Innovation Management
20	SM624	International Finance

SECOND SESSION ( 10.30 AM to 1.30 PM )		
Sl.No	Subject Code	Subject Name
1	CE100	Engineering Mechanics
2	CE130	Environment and Safety Engineering
3	CE604	Finite Element Method
4	CH638	Advanced Reaction Engineering & Reactor Design
5	CR424	Composite Materials
6	CS629	Network Security
7	EC436	Biomedical Instrumentation
8	EC446	Adaptive Signal Processing
9	EC646	Adaptive Signal Processing
10	EE406	High Voltage DC Transmission
11	EE732	System Design using HDL
12	MA524	Statistical Methods
13	ME440	Industrial Management
14	MM634	Metallurgical Failures: Detection and Analysis
15	MN438	Solid Waste Management
16	PH508	Atomic and Molecular Physics
17	SM616	Retail Management
18	SM634	Organization Change and Development

Sd/-  
Asst. Registrar(Academic)

**Copy to:**

1. All Notice Boards (Institute/Halls of Residence).
2. All Deans/ Chief Warden.
3. Registrar.
4. Professor In-charge Examinations
5. All Wardens of Halls.
6. All HODs are requested to send the question papers in sealed packets ( packets supplied by Academic Office) containing required number of question papers Hall wise ( actual student strength in the hall + 05 extra) as per the Hall arrangement list latest by **16-Apr-2014**. On the packet containing questions the HODs/ concerned faculty members are requested to clearly state the list of requisite tables, codes, charts etc, to be supplied to the student by the academic office during the examination.

*[A sample copy of the relevant material may be attached on the question packet or may be sent to the undersigned separately for official record and timely supply]*

*\*\* All faculties are requested to mention their mobile number on the question packets for any emergency queries during the examination.*

7. Security Officer.

8. In-charge (Technical Service).