



# 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)**

**09-NOV-2013**

**Day 1 : Date / Day of Examination : 22-NOV-2013 ( Friday )**

FIRST SESSION ( 8.30 AM - 11.30 AM )		
Sl.No	Subject Code	Subject Name
1	BM403	Biomedical Engineering
2	BM601	Quantitative Physiology
3	BM624	Surface Engineering of Medical Implants
4	BM642	Biophysics & Structural Biology
5	BM643	Advanced Protein Engineering
6	BM652	Advanced Biochemical Engineering
7	CE100	Engineering Mechanics
8	CE130	Environment and Safety Engineering
9	CE403	Optimization Methods in Engineering
10	CE604	Finite Element Method
11	CE612	Stability of Structures
12	CE620	Ground Improvement Techniques
13	CE640	Analysis and Structural Design of Pavements
14	CE652	Open Channel Flow
15	CH330	Petroleum Refinery Engineering and Petrochemicals
16	CH439	Non-Traditional Optimization Techniques
17	CH611	Advanced Fluid Dynamics
18	CH638	Advanced Reaction Engineering & Reactor Design
19	CR419	Biomaterials for Artificial Implants
20	CR615	Non-Oxide Ceramics
21	CR622	Glass and Glass Ceramic for Technical Application
22	CR653	Manufacturing Technology of Electroceramics
23	CS343	Digital Logic Design
24	CS448	Artificial Intelligence & Neural Network
25	CS630	Artificial Intelligence
26	CS631	Information Theory and Coding
27	CS635	Biometric Security
28	CS652	Software Architecture
29	EC200	Fundamentals of Communication Systems
30	EC340	Fundamentals of Digital Signal Processing
31	EC440	Soft Computing Techniques
32	EC450	Fundamentals of Digital Image Processing
33	EC616	Microwave Engineering
34	EC623	HDL and High Level VLSI Design

SECOND SESSION ( 1.30 PM - 4.30 PM )		
Sl.No	Subject Code	Subject Name
1	BM317	Fundamentals of Tissue Engineering
2	BM443	Introduction to Biotechnology
3	CE303	Remote Sensing and Geographical Information System
4	CE611	Advanced Structural Analysis
5	CE621	Advanced Soil Mechanics
6	CE651	Hydrologic Element and Analysis
7	CE663	Mass Transit Systems
8	CH229	Basic Chemical Engineering
9	CH329	Process Plant Safety
10	CR219	Introduction to Ceramics
11	CS212	Object Oriented Programming and Web Application Using C#
12	CY413	Spectroscopic Methods of Analysis
13	CY431	Chemistry of Nanomaterials
14	CY621	Advanced Inorganic Chemistry
15	CY623	Catalysis - Principles and Applications
16	CY636	Special Topics in Physical Chemistry
17	EC633	P. C. Based Instrumentation
18	EC655	Transform Domain Signal Processing
19	EE621	Power Electronic Converters and Machine Drives
20	EE629	Digital Control
21	EE641	Digital Communication
22	HS317	Introduction to the Structure of Modern English
23	HS328	Sports Psychology
24	HS420	Human Resource Management.
25	ID611	Advanced Product Design and Development
26	LS406	Fundamentals of cell biology
27	LS701	Research methodology
28	MA311	Linear Algebra
29	MA424	Operations Research
30	ME231	Total Quality Management
31	ME417	Control System Engineering
32	ME610	Analysis and Synthesis of Mechanism
33	ME634	Metal Cutting and Tool Design
34	ME651	Advanced Fluid Mechanics

35	EE209	Network Analysis
36	EE309	Power Generation Systems
37	HS311	Communicative English.
38	HS341	Managerial Economics
39	HS428	Psychometrics
40	HS538	Urban Governance and Development
41	ID220	Fundamentals of Computer Graphics and Solid Modelig
42	MA427	Elementary Number Theory
43	MA619	Functional Analysis
44	MA627	Optimization Techniques with Applications
45	ME311	Composite Material
46	ME430	Industrial Management
47	MM652	Experimental Techniques in Materials Engineering
48	MN206	Introductory Mining Technology
49	PH321	Physics of Semiconducting Materials
50	PH351	Science of Nanomaterials
51	PH407	Quantum Mechanics - I

35	MM317	Materials Technology
36	MM325	Iron Making and Steel Making
37	MM665	Powder Technology
38	MN338	Mineral Beneficiation
39	MN601	Rock Excavation Engineering
40	MN641	Mine Legislation and Safety Engineering
41	PH311	Fundamentals of Thermal & Statistical Physics
42	PH331	World of LASERS
43	PH612	Advance Statistical Mechanics
44	SM501	Organizational Behaviour and Structure
45	SM601	Strategic Management

FIRST SESSION ( 8.30 AM - 11.30 AM )		
Sl.No	Subject Code	Subject Name
1	BM331	Bioheat and Mass Transfer
2	BM621	Advanced Biomaterials
3	BM629	Regenerative medicine and stem cell
4	CE301	Advanced Surveying
5	CE313	Advanced structural analysis
6	CE619	Composite Structures
7	CE643	Highway and Airport Pavement Materials
8	CE659	Water Resources Management
9	CH321	Fundamentals of Biochemical Engg.
10	CH629	Interfacial Science and Engineering
11	CR333	Heat Transfer and Fluid Flow
12	CR335	Instrumental Characterization
13	CR663	Testing and Ceramic Characterization
14	CS338	Systems Software
15	CY322	Basic Inorganic Chemistry-I
16	CY515	Spectroscopic Methods of Analysis
17	CY537	Advanced Solid State Chemistry
18	EC100	Basic Electronics Engineering
19	EC331	Control System Engineering
20	EC653	Image Processing & Computer Vision
21	EE100	Basic Electrical Engineering
22	EE345	Communication Systems Principles
23	HS541	Economics of Development
24	ID332	Interaction Design and Usability Engineering
25	LS405	Cell Biology
26	MA317	Linear Algebra
27	MA623	Advanced Number Theory
28	MA625	Stochastic Processes
29	ME353	Internal Combustion Engines
30	ME601	Optimization Method in Engineering Design
31	ME602	Robotics
32	ME611	Vibration Analysis and Diagnostics
33	ME621	Analytical Methods in Rotor Dynamics
34	ME632	Machine Tool Technology
35	ME637	Production System and Computer Integrated Manufacturing
36	ME652	Heat Transfer-II:Convection Heat Transfer
37	ME662	Thermal Processes in Surface Engineering
38	MM336	Mechanical Working of Metallic Materials
39	MM352	Material Characterization Techniques
40	MM615	Structure and Properties of Materials
41	MM638	Mechanical Working of Materials
42	MN331	Solid Fuel Technology

SECOND SESSION ( 1.30 PM - 4.30 PM )		
Sl.No	Subject Code	Subject Name
1	BM201	Anatomy and Physiology
2	CE209	Concrete Technology
3	CE451	Irrigation Engineering
4	CH225	Chemical Process Calculations
5	CH415	Fluidization Engineering
6	CR231	Properties of Ceramic Raw Materials
7	CR421	Glasses for Advanced Technical Application
8	CS243	Digital Electronics
9	CS425	Data Warehousing and Mining
10	CS623	Ad-hoc and Wireless Networks
11	CY221	Chemistry of Industrial Materials
12	CY539	Biophysical Chemistry
13	CY615	Advanced Environmental Chemistry
14	CY616	Nuclear Magnetic Resonance Spectroscopy
15	EC203	Networks
16	EC421	Digital VLSI Design
17	EE241	Network Theory
18	EE611	Machine Analysis
19	EE625	Systems and Control Theory
20	EE643	Microwave and Antenna Systems
21	HS536	Trends and issues in Tribal Studies
22	HS610	Research Methodology
23	ID221	Mechanisms and Machines
24	LS513	Enzymology and Metabolism
25	LS707	Structural basis of cell signaling
26	LS720	Microbial Diversity and Extremophiles
27	LS730	Food and Bioprocess Technology
28	MA401	Real Analysis
29	MA413	Analysis - II
30	ME251	Engineering Thermodynamics
31	ME451	Power Plant Engineering
32	ME600	Applied Finite Element Analysis
33	ME615	Computer Aided Design of Machines
34	ME640	Laser Application in Manufacturing
35	MM215	Physics of Materials
36	MM442	Advanced Materials
37	MM626	Alternative Routes of Iron Making
38	MN207	Mining Geology
39	MN610	Mining of Deep Seated Deposits
40	MN643	Advanced Mineral Processing Technology
41	PH601	Problems in classical Physics
42	PH632	Physics of Macromolecules
43	PH667	Low Temperature Properties of Matter

43	PH303	Optics
44	PH409	Introduction to Spectroscopy
45	SM509	Research Methodology
46	SM631	Employee Relations and Labour Legislations

44	SM617	Sales and Distribution Management
45	SM621	Financial Institutions, Instruments and Markets

**Day 3 : Date / Day of Examination : 26-NOV-2013 ( Tuesday )**

<b>FIRST SESSION ( 8.30 AM - 11.30 AM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM343	Bioinformatics
2	BM623	Advanced Tissue Engineering
3	CE311	Structural Design
4	CE615	Applied Elasticity and Plasticity
5	CE628	Earth Retaining Structures
6	CE644	Planning and Design of Airports
7	CE657	Water Quality Modeling and Management
8	CH311	Heat Transfer Operations
9	CR331	Whiteware Technology
10	CR631	Industrial Ceramic Processing
11	CS321	Data Communication
12	CS625	Data Mining and Data Warehousing
13	CY101	Chemistry
14	CY511	Stereochemistry and Reaction Mechanism
15	EC300	Microprocessor
16	EC615	Mobile Communication
17	EE301	Electrical Machines II
18	HS511	Technical and Business Communication
19	ID311	Product Design - I
20	LS401	Microbiology
21	LS721	Bioethics and Intellectual Property Right
22	MA403	Linear Algebra
23	MA612	Linear Algebra
24	ME351	Fluid Mechanics
25	ME633	Modern Manufacturing Processes
26	ME648	Quality Engineering and Reliability
27	ME657	Computational Methods in Thermal Engineering
28	ME675	Vibration and Machine Dynamics Laboratory
29	ME711	Fundamentals of Tribology
30	MM311	Phase Transformation
31	MN311	Surface Mining Technology
32	PH301	Waves and Oscillation
33	PH401	Mathematical Methods in Physics
34	SM503	Managerial Economics

<b>SECOND SESSION ( 1.30 PM - 4.30 PM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM421	Tissue engineering
2	CE401	Estimation and Construction Management
3	CH421	Reaction Kinetics and Catalysis
4	CH623	Environmental Management System
5	CR411	Advanced Ceramics
6	CS412	Software Engineering
7	CY533	Quantum Chemistry
8	CY632	Chemistry of Nanomaterials
9	EC433	Process Control & Instrumentation
10	EC622	Analog & Mixed Mode VLSI
11	EC624	Embedded Computing Systems
12	EC654	Statistical Signal Processing
13	EE405	Utilization of Electrical Energy and Drives
14	EE604	Flexible AC Transmission Systems
15	EE607	Extra High Voltage Transmission
16	EE622	Advanced Power Electronic Converters
17	EE633	Optimal Control
18	EE653	Digital Image Processing
19	HS535	Gender and Development
20	HS612	Environment and Society
21	ID431	Ergonomics in Design
22	ID617	Design for Quality and Reliability
23	LS420	Applied Bioinformatics
24	LS704	Cancer biology
25	LS705	Advanced microbiology
26	LS715	Developmental biology
27	LS726	Molecular Biophysics
28	MA201	Mathematics - III
29	MA207	Introduction to Numerical Analysis
30	MA501	Abstract Algebra
31	MA503	Theory of Rings and Fields
32	ME411	Vibration and Noise Engineering
33	ME608	Control system Engineering
34	ME618	Rotor Dynamics
35	ME647	Production Management
36	ME654	Advanced Thermodynamics
37	MM431	Mechanical Behaviour of Materials
38	MM637	Mechanical Behaviour of Materials
39	MM642	Advances in Material Science and Engineering
40	MM659	Vacuum Technology in Materials Engineering
41	MN431	Mine Environmental Engineering
42	MN613	Underground Mining Systems
43	MN642	Hydrogeology

44	PH507	Nuclear and Particle Physics
45	PH651	Crystal Symmetry and Crystal Physics
46	SM613	Consumer Behaviour and Marketing Research

**Day 4 : Date / Day of Examination : 27-NOV-2013 ( Wednesday )**

FIRST SESSION ( 8.30 AM - 11.30 AM )		
Sl.No	Subject Code	Subject Name
1	BM311	Medical Signal and Signal Processing
2	BM358	Bioreactor Analysis and Design
3	BM625	Nanobiotechnology
4	CE331	Environment Engineering
5	CE613	Analysis and Design of Plates and Shells
6	CE614	Advanced Reinforced Concrete Design
7	CE625	Soil Exploration and Analysis of Foundations
8	CE654	Hydraulic Structures and Hydropower Engineering
9	CE655	Computational Fluid Dynamics
10	CH337	Equipment Design (Mech. Aspects)
11	CH626	Nano Science and Technology
12	CH631	Process Plant Simulation
13	CR327	Interface Science and Sol- Gel Processing
14	CR415	Bio-ceramics
15	CR435	Functional Materials and Devices
16	CR647	Advanced Composites
17	CS341	Microprocessors and Microcontrollers
18	CS613	Combinatorial Optimization
19	CS619	Software Engineering Requirement & Modeling
20	CY231	Basic Physical Chemistry I <b>(5th Sem)</b> <b>(MA5,PH5)</b>
21	CY312	Basic Organic Chemistry-II
22	CY531	Thermodynamics and Chemical Equilibria
23	EC311	Analog Communication Systems
24	EC312	Electromagnetic Theory
25	EC621	Digital VLSI Design
26	EE341	Embedded Systems
27	HS531	Social Institutions and Development
28	ID351	Industrial Mechatronics
29	LS440	Physical Sciences and Instrumentation
30	LS727	Advance Techniques
31	MA407	Topology
32	MA620	Analytic Number Theory
33	ME331	Metal Machining and Automation
34	MM331	Deformation Theory of Metals
35	MM611	Phase Transformation of Materials
36	MN303	Material Handling Systems
37	MN332	Remote Sensing and Its Application
38	PH101	Physics I
39	SM507	Marketing Management
40	SM635	Training and Development

SECOND SESSION ( 1.30 PM - 4.30 PM )		
Sl.No	Subject Code	Subject Name
1	BM441	Protein Engineering
2	CE203	Mechanics of Solids
3	CE423	Advanced Foundation Engineering
4	CH223	Chemical Process Technology
5	CH427	Colloid and Interfacial Engineering
6	CR211	Unit Operations in Ceramic Processing
7	CR417	Unshaped Refractories
8	CR443	Application of Phase Diagrams
9	CR445	Application of Phase Diagrams
10	CR661	Technical Ceramics
11	CS241	Analog Electronics
12	CS421	Computer Networks
13	CY231	Basic Physical Chemistry I <b>(3rd Sem)</b> <b>(CY5)</b>
14	CY542	Pericyclic reactions and Photochemistry
15	CY622	Organometallic Compounds and their Application
16	CY634	Advanced Surface and Interface Analysis
17	EC201	Analog Electronics
18	EC419	Computer Communication Network
19	EC434	Analytical Instrumentation
20	EC630	Industrial Electronics and Instrumentation
21	EC762	Advanced Wireless Communication
22	EE203	Electrical Machines I
23	EE425	Control System - II
24	EE427	Soft Computing
25	EE606	Transient in Power Systems
26	EE615	Power System Dynamics
27	EE631	Industrial Electronics
28	EE636	System Identification and Adaptive Control
29	EE668	Instrumentation and Sensors
30	HS539	Theory of Money, Output and Employment
31	HS602	English Language Teaching
32	ID451	Industrial Automation
33	ID655	CNC Systems and Programming
34	LS201	Biochemistry
35	LS512	Developmental Biology
36	LS706	Advanced molecular biology
37	LS725	Biophysics
38	LS729	Biofuels
39	MA203	Real Analysis I
40	MA205	Calculus
41	MA531	Boundary Layer Theory
42	ME213	Mechanics of Solids

43	ME603	Applied Elasticity and Plasticity
44	MM211	Science and Technology of Materials
45	MM449	Nanostructured Materials
46	MM620	Principles of Iron Making
47	MN415	Advanced Metaliferrous Mining
48	MN681	Special Topics in Mining Engineering - I
49	PH551	Crystal Symmetry and Crystal Physics
50	PH605	Experimental Techniques
51	SM627	Security Analysis and Portfolio Management



FIRST SESSION ( 8.30 AM - 11.30 AM )		
Sl.No	Subject Code	Subject Name
1	BM321	Biomaterials
2	BM341	Genetic Engineering
3	BM611	Biomedical Signal Processing And Analysis
4	BM627	Cryo-Tissue Engineering
5	CE321	Mechanics of Soil
6	CE601	Material Technology
7	CE610	Structural Dynamics and Earthquake Engineering
8	CE622	Stability Analysis of Slopes, Dams and Embankments
9	CE623	Soil-Structure Interaction
10	CE641	Transportation Systems Planning
11	CE642	Traffic Engineering and Traffic Flow Theory
12	CE653	Advanced Fluid Mechanics
13	CH426	Coal Processing Technology
14	CH615	Advanced Heat Transfer
15	CH643	Environmental Management System
16	CR341	Physical Ceramics
17	CR620	Industrial Glass Making
18	CS331	Theory of Computation
19	CS614	Software Project, Process and Quality Management
20	CS638	Pattern Recognition
21	CY521	Principles of Inorganic Chemistry
22	EC341	Digital Signal Processing
23	EC611	Digital Communication
24	EC620	MCS VLSI
25	EE311	Transmission and Distribution of Electric Power
26	HS522	Social Psychology and its Applications
27	HS608	Social Change
28	ID341	Manufacturing Processes
29	LS402	Biochemistry
30	LS581	Cancer biology
31	LS711	Bioinformatics
32	MA101	Mathematics - I
33	MA315	Abstract Algebra
34	MA405	Partial Differential Equations
35	MA610	Real Analysis
36	MA611	Algebra (Problem Solving Course)
37	MA613	Topology (Problem Solving Course)
38	ME333	Process Control and Assurance Science
39	ME646	Reliability analysis and Maintenance Management
40	ME710	Advanced Composites

SECOND SESSION ( 1.30 PM - 4.30 PM )		
Sl.No	Subject Code	Subject Name
1	CE201	Civil Engineering Materials and Construction
2	CE413	Advanced Design of Reinforced Concrete Structures
3	CH211	Processing and Handling of Materials
4	CH419	Computational Fluid Dynamics
5	CR223	Materials Thermodynamics
6	CR441	Electrical and Magnetic Ceramics
7	CS211	Discrete Mathematics
8	CS434	Image Processing
9	CS636	Image Processing
10	CY525	Advanced Co-ordination Chemistry
11	CY624	Special Topics in Inorganic Chemistry
12	EC416	Microwave Engineering
13	EC431	PC based Instrumentation
14	EC631	Analytical Instrumentation
15	EE243	Analog Electronics
16	EE401	Power System Operation and Control
17	EE642	Wireless Communication
18	EE645	Adaptive Signal Processing
19	HS500	Research Methodology
20	HS524	Cognitive Development and Assessment
21	HS609	Ethics and Values
22	ID441	Computer -Aided Manufacturing
23	ID613	Elements of Design
24	LS203	Microbiology
25	LS504	Environmental Sciences and Biostatistics
26	LS702	Environmental Sciences
27	LS703	Epigenetics
28	LS710	Molecular medicine
29	LS728	Food Microbiology
30	MA515	Homotopy Theory
31	ME211	Kinematics and Dynamics of Machinery
32	ME250	Thermal Engineering
33	ME431	Decision Modeling
34	ME614	Experimental Stress Analysis
35	ME620	Nonlinear Oscillation
36	ME631	Production Technology
37	ME659	Cryogenic Process Engineering
38	ME701	Composite Materials
39	ME765	Advanced IC Engine Technology
40	MM201	Metallurgical Thermodynamics and Kinetics
41	MM427	Sponge Iron Technology
42	MM601	Metallurgical Thermodynamics and Kinetics

41	MM636	Advanced Processing of Materials
42	MM642	Advances in Material Science and Engineering
43	MN321	Rock Mechanics
44	PH405	Statistical Mechanics
45	SM505	Financial and Cost Accounting
46	SM637	Employee Compensation and Benefits Management

43	MM603	Metallurgical Thermodynamics and Kinetics
44	MN201	Mine Development
45	MN441	Mine Legislation and Safety Engineering
46	MN623	Advance Environmental Engineering
47	PH201	Heat and Thermodynamics
48	PH512	Advanced Statistical Mechanics
49	PH602	Problems in Quantum Physics
50	PH604	Fundamentals of Quantum Mechanics and Electro Dynamics
51	SM615	Product and Brand Management

<b>FIRST SESSION ( 8.30 AM - 11.30 AM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	BM641	Immunotechnology
2	CH315	Mass Transfer Operations
3	CH613	Advanced Mass Transfer
4	CR654	Sintering and Microstructure
5	CS427	Network Security
6	CS621	Cryptographic Foundations
7	EC415	Mobile Communication
8	EC651	Digital Filter Design
9	EE417	High Voltage Engineering
10	HS543	Global Issues in Development
11	HS613	Developmental Cognitive Neuroscience
12	MA630	Advanced Fluid Dynamics
13	MM314	Heat Treatment of Metallic Materials
14	MM321	Iron Making
15	MM435	Fracture Mechanics and Failure Analysis
16	MM446	Composite Materials
17	MM646	Composite Materials
18	MN305	Mineral Processing Technology
19	SM511	Management Information System

<b>SECOND SESSION ( 1.30 PM - 4.30 PM )</b>		
<b>Sl.No</b>	<b>Subject Code</b>	<b>Subject Name</b>
1	CE316	Advanced Mechanics of Solids
2	CR418	Nanomaterials
3	CR610	Advanced Refractories
4	CR635	Whiteware Production and Practices
5	CR652	Applications of Phase Diagrams in Ceramic Industries
6	CS616	Algorithm Design
7	CY211	Name Reaction And Rearrangements
8	CY611	Advanced Analytical Chemistry
9	CY617	Special Topics in Organic Synthesis
10	EC646	Adaptive Signal Processing
11	EE637	Soft computing Techniques
12	HS604	Advanced Developmental and Cultural Psychology
13	HS614	Critical Approaches
14	LS708	Advanced immunology
15	LS731	RNA Interference
16	ME650	Heat Transfer – I: Conduction and Radiation Heat Transfer
17	MM606	X - Ray and Electron Microscopy
18	MN635	Advanced Mine Ventilation
19	PH403	Classical Mechanics
20	PH603	Classical & Statistical Physics
21	PH644	Polymer Physics
22	PH664	Magnetism Principles and Application
23	SM623	Commercial Banking

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**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 **18.11.2013**. 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).

