

**Details of New Courses  
Approved by the Board of Studies**

2018-19

भाज दिनांक 29-6-18 शुक्रवार को राजनीति विभाग विभाग में अध्ययन मॉडल की बैठक आयोजित हुई। बैठक में विषय विशेषज्ञ विभाग में प्राध्यापक गण एवं मेधावी छात्र उपस्थित हुए। बैठक में निम्न विद्वुओं पर चर्चा उपरान्त सर्वसम्मति से निर्णय लिये गये।

उपस्थित सदस्य -

- (1) डा. मंजनी शुक्ला (सेवा निवृत्त प्राचार्य)
- (2) डा. रीना मजूमदार प्राचार्य
- (3) डा. प्रेमलता तिवारी
- (4) मन्सुमाल कुरी (मेधावी छात्र)
- (5) डा. श्रिमती नन्द्या रेखा
- (6) डा. मरुगा शर्मा
- (7) डा. कर्तिन साहू

बैठक में सर्वसम्मति से विचारकर निम्न निर्णय लिये गये।

M. A. प्रथम Semester में समुप प्रश्न पत्र "मुख्य देशों की विदेश नीतियां" के तथान पर विशेषकर विश्व विद्यालय के प्रश्न पत्र के अनुसार "द्वितीय महायुद्ध के बाद राजनीति प्रश्न पत्र में होने हेतु प्रस्ताव पर सभी प्राध्यापकों के द्वारा सहमति दी गयी।

(2) -नाटक त्तर पर पाठ्यक्रम विश्वविद्यालयीन पाठ्यक्रम के अनुसार ही रहेगा।

आज दिनांक 22-7-19 (सोमवार) को राजनीति विज्ञान विभाग में अध्ययन मॉडल की बैठक आयोजित हुई। बैठक में विषय विशेषज्ञ, विभाग के समस्त प्राध्यापक गण एवं मेधावी छात्र उपस्थित हुए। बैठक में निम्न बिन्दुओं पर चर्चा के उपरान्त सर्वसम्मति से निर्णय लिए गये।

उपस्थित सदस्य -

- (1) डॉ. रेखा पाण्डेय (प्राचार्य)
- (2) डॉ. शीना भजूम द्वार (प्राचार्य)
- (3) डॉ. प्रेमलता तिवारा (सहा. प्रा.)
- (4) अनुपम कुमार (मेधावी छात्र)
- (5) डॉ. न-दा नेमरु
- (6) डॉ. अरुणा शर्मा
- (7) डॉ. कीर्तन साहू

बैठक में निम्न बिन्दुओं पर विचारोपरान्त सर्वसम्मति से निम्न निर्णय लिए गये।

(1) दिनांक 26-7-2019 को प्रश्नपत्र के प्रकार के परिवर्तन के सम्बन्ध में प्राचार्य का समस्त विभागाध्यक्षों की आयोजित बैठक में लिए गये निर्णय के आधारे पर सुनिश्चित किया गया कि ज्ञातक एवं ज्ञातकोत्तर तर्क के सभी पाठ्यक्रमों के सभी प्रश्न पत्रों में प्रश्नपत्रों के प्रकार का अंतरण किया जायेगा।

(ii) B.A. प्रथम  
वर्ष में विश्वविद्यालयीन परिवर्तित  
पाठ्यक्रम के अनुसार लागू किया जाएगा

(iii) B.A. द्वितीय एवं B.A. तृतीय  
वर्ष पर पाठ्यक्रम विश्वविद्यालयीन  
पाठ्यक्रम के अनुसार होगा।

(iv) M.A. IVth Sem. राजनीति विज्ञान के  
धारा / धारार्थ विषय से सम्बंधित सिग्नेचर  
कार्य करेंगे।

(v) स्नातकोत्तर वर्ष पर पाठ्यक्रम 2018-2019  
के पाठ्यक्रम को ही लागू किया गया है।

Meeting की सभारि अंत में छात्रों का कक्षा के  
साथ हुई।

प्राचार्य

श्री शीता भद्रमदार - 22/07/2019

डॉ. प्रेमलता तिवारी - 22.07.19.

अरुण कुमार (प्रेषाजी दात्र) - 22.07.19.

डॉ. नन्द्या प्रकाश - 22-7-19

अंकीत कुमार

शासकीय जे. योगानन्दम् छातीसगढ महाविद्यालय रायपुर (छ.ग.)

विभाग का नाम :- राजनीति विज्ञान

सत्र : 2018-19

विगत वर्ष के पाठ्यक्रम में किया गया परिवर्तन

विषय का नाम :- राजनीति विज्ञान एम.ए. प्रथम सेमि-चतुर्थ प्रश्नपत्र

प्रश्न पत्र क्रमांक :- MPOI-D

प्रश्न पत्र का नाम :- छत्तीसगढ शासन एवं राजनीति 100% change

पूर्णांक :- 80

उत्तीर्णांक :- 16

परिवर्तन से संबंधित विवरण :

राजनीति विज्ञान एम.ए. प्रथम सेमेस्टर के चतुर्थ प्रश्नपत्र 'प्रमुख देशों की विदेश नीतियाँ' के स्थान पर 'छत्तीसगढ शासन एवं राजनीति' प्रश्नपत्र रखा गया है।

9/1 प्रचार्य

अध्ययन मण्डल के सदस्यों के हस्ताक्षर

एम.ए. - प्रथम सेमेस्टर

विषय का नाम	-	राजनीति विज्ञान
प्रश्न पत्र क्रमांक	-	चतुर्थ
प्रश्न पत्र का नाम	-	छत्तीसगढ़ शासन एवं राजनीति (C.G. Government & Politics)

पूर्णांक - 80

उत्तीर्णांक - .....16.....

<p><b>Note:</b></p> <p>(1) The question paper will consist of two sections, Section A and Section B.</p> <p>(2) Section A will consist of five short answer types question (one question from each unit) from question 1 to 5 and each question will carry equal marks. Word limits maximum 75 words. All questions will be compulsory.</p> <p>(3) Section B will consist of five long answer questions (one question from each unit). All questions will have internal option and each question carry equal marks. Word limits maximum 300 words.</p> <p>(4) Total number of question will be 10 in the paper.</p> <p>(5) 5 questions in section A will be from Sr. 1 to 5 and 5 question in section B will be from Sr. 6 to 10.</p>	<p><b>टीप :-</b></p> <p>(1) प्रत्येक प्रश्न पत्र के 2 खंड होंगे खंड अ व खंड ब</p> <p>(2) खंड अ में 5 लघुउत्तरीय प्रश्न होंगे (प्रत्येक इकाई से एक) प्रश्न क्र. 1 से 5 तक सभी समान अंक के प्रश्न होंगे, शब्द सीमा अधिकतम 75 शब्द होगी। सभी प्रश्न अनिवार्य होंगे।</p> <p>(3) खंड ब में 5 दीर्घउत्तरीय प्रश्न होंगे (प्रत्येक इकाई से एक) सभी प्रश्न आंतरिक चयन के साथ समान अंक के होंगे। शब्द सीमा अधिकतम 300 शब्द होगी।</p> <p>(4) प्रश्न पत्र में प्रश्नों की संख्या कुल 10 होगी।</p> <p>(5) खंड अ से 5 प्रश्न (1 से 5 तक) व खंड ब के 5 प्रश्नों का क्रम (6 से 10 तक) होगा।</p>
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Section	No. of Question	Marks (75)
A	05	5x4=20
B	05	5x12=60
	Max. Marks	80

**Unit -I**

राज्यों का पुर्नगठन (2000) तथा छत्तीसगढ़ का निर्माण, छत्तीसगढ़ राज्य निर्माण हेतु आंदोलन।

Re-organization of States (2000) and formation of Chhattisgarh, Movement for the formation of Chhattisgarh State.

**Unit -II**

छत्तीसगढ़ की राजनीति के निर्धारक तत्व एवं विशेषता, छत्तीसगढ़ निर्माण के बाद समस्याएँ एवं समस्याओं को दूर करने हेतु सुझाव।

Determinants and Characteristics of Politics in Chhattisgarh. Problems after formation of Chhattisgarh and suggestions to solve the problems.

03-11-20

Answer

### Unit -III

छत्तीसगढ़ में स्थानीय स्वशासन एवं पंचायती राज, छत्तीसगढ़ में जिला प्रशासन एवं जिलाधीश की भूमिका।

Local self Government and Panchayati Raj in Chhattisgarh, District Administration in Chhattisgarh and role of Collector.

### Unit -IV

छत्तीसगढ़ में विधानसभा की रचना एवं कार्यप्रणाली, मतदान व्यवहार।

Structure and Procedure of Vidhan Sabha in Chhattisgarh, Voting Behaviour.

### Unit -V

छत्तीसगढ़ में किसान आंदोलन, नक्सलवाद, समस्या एवं समाधान के उपाय, छत्तीसगढ़ के विकास की राजनीति एवं विकास की योजनाएँ।

Kissan Movement in Chhattisgarh Problems and Solutions of Naxalism, Politics of Development in Chhattisgarh and Scheme of Development.

### अनुशंसित पुस्तकें

#### Recommended Books'

- 1) A. Bajpai, Panchayati Raj and Rural Development .
- 2) B. Maheshwari, Local Govt. in India Agra, Lakshmi Narain Agrwal, 1996 .
- 3) S. Jha and P. C. Mathur, Decentralization and Local Politics.
- 4) आर. एल. खन्ना, भारत में पंचायती राज।
- 5) एस. के. डे., पंचायती राज का अध्ययन।
- 6) अवस्थी एवं अवस्थी, भारत में स्थानीय स्वशासन।
- 7) संजय त्रिपाठी एवं श्रीमती चंदन त्रिपाठी, छत्तीसगढ़ वृहद संदर्भ।

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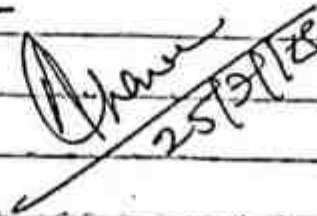


सत्र - 2018-19

शासक जे. मो. ह. ग. पां. जी. महाविद्यालय शयपुर में दिनांक  
25-07-2018 को आद्यतन मंडल की बैठक आयोजित हुई।  
जिसमें वी. एस. सी. कक्षाओं के विगे क्षेत्रीय आद्यतन मंडल  
पं. इविशंकर शुभल विश्वविद्यालय द्वारा स्वीकृत पाठ्यक्रम  
गयावत लागू करने का निर्णय लिया गया। विभागाध्यक्ष को  
मह दायित्व दिया गया है कि जब भी पाठ्यक्रम में  
परिवर्तन होगा उसकी दायित्व स्वशासी विभाग में अमा करेंगे।

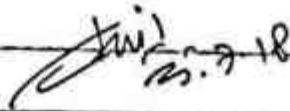
बैठक में उपस्थित सदस्य -

1. डा. स. ठे. खरे

  
25/7/18

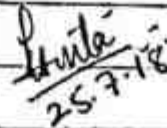
2. डा. के. के. हेरिस

शास. दु. व. महिला महा. शयपुर

  
25.7.18

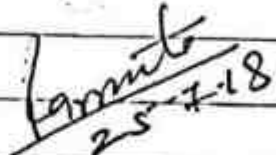
3. डा. कविता दास

शास. नागार्जुन विश्वान महा. शयपुर

  
25.7.18

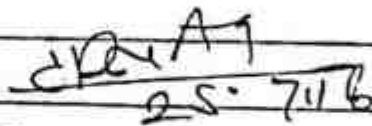
4. डा. पारमिता दुबे

शास. जे. मो. ह. ग. महा. शयपुर

  
25.7.18

5. डा. सरना रानी नाग

शास. जे. मो. ह. ग. महा. शयपुर

  
25.7.18

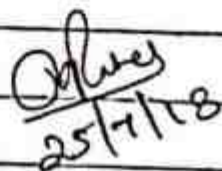
6. डा. अनिल रामटेके

शास. जे. मो. ह. ग. महा. शयपुर

  
25/7/18

7. ममता पटेल

शास. जे. मो. ह. ग. महा. शयपुर

  
25/7/18

दिनांक 25-07-2018 को अधमन मंथन की बैठक में  
सम: स्म. सी. प्राणीशास्त्र का पाठ्यक्रम प्रथम, द्वितीय, तृतीय  
एवं चतुर्थ सेमेस्टर के लिये लागू करने का निर्णय  
लिखा गया।

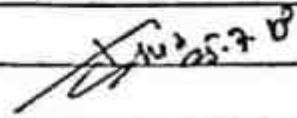
बैठक में उपस्थित सदस्य -

1. डा. सु. के. शर्मा

  
25/7/18

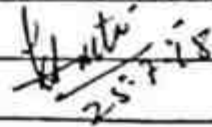
2. डा. के.के. हेरिस

शास. डु. व. महिला महा. रायपुर

  
25/7/18

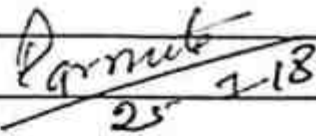
3. डा. कविता दास

शास. नागार्जुन विज्ञान महा. रायपुर

  
25/7/18


4. डा. पारमिता डुबे

शास. जे. प्रो. ए. ग. महा. रायपुर

  
25/7/18

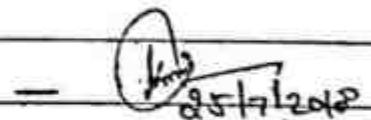
5. डा. अरुणा रानी नाग

शास. जे. प्रो. ए. ग. महा. रायपुर

  
25/7/18

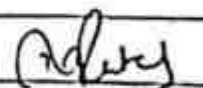
6. डा. अनिल रामटेके

शास. जे. प्रो. ए. ग. महा. रायपुर

  
25/7/18

7. ममला परेल

शास. जे. प्रो. ए. ग. महा. रायपुर



25/7/18

July-Dec.2018

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M.Sc. (III Semester) Zoology

Paper No.	Title of Paper	Theory	Test	Marks
I	Developmental Biology	80	20	100
II	Animal behavior	80	20	100
III	Environmental physiology and Endocrinology	80	20	100
IV	Biology of parasitism	80	20	100
LC-I	Lab Course I (Based on paper I & II)	-	-	100
LC-II	Lab Course II (Based on paper III & IV)	-	-	100
Total		Ecology and Limnology		600

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III<sup>rd</sup> Semester  
Paper-I: Developmental Biology

**Unit-I**

1. Oogenesis

1.1. differentiation and growth of Oocytes

1.2. Organization of egg cytoplasm and egg cortex

1.3. Vitellogenesis

2.Spermatogenesis-

2.1Differentiation and ultra structure of sperm  
Capaciation

**Unit-II**

1- Fertilization-

1.1 recognition of gametes

1.2 acrosome reaction

1.3 activation of egg metabolism

2-Cleavage- pattern and mechanism of cleavage

**Unit-III**

1. Formative movements.

2.Multiple ovulation and embryo transfer technology

3.super ovulation

4.Teratology.

**Unit-IV**

1.Parthenogenesis

2.Concept of organizer.

3.Competence.

4.Nucleo- cytoplasmic interaction

5. metamorphosis.(Complete and incomplete)

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25-7-18

III<sup>rd</sup> Semester  
Paper-II: Animal Behavior

**Unit-I**

1. Introduction- history & branches.
2. Behaviour pattern
3. Innate behavior.
4. Biological rhythm. Types of biological rhythm and biological clock

**Unit-II**

1. Communications-chemical, visual, audio, evolution of language (primates honey bee).
2. Learning & memory- conditioning, habituation.
3. Reasoning.
4. Reproductive Behavior

**Unit-III**

1. Orientation.
2. Echolocation in Bat.
3. Bird migration and navigation.
4. Fish migration.
5. Neural and hormonal control of behavior.

**Unit-IV**

1. Hormonal effect on behavior. *Patterns.*
2. Social behavior –
  - 2.1 Social organization in insects & primate.
  - 2.2 Schooling in fishes & flocking in birds.
  - 2.3. Homing, territoriality, Dispersal.
  - 2.4 Altruism.
  - 2.5 Host-Parasite relation.

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27.7.18.  
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III<sup>rd</sup> Semester

Paper-III: Environmental Physiology and Endocrinology

Unit-I

1 Adaptation-

- 1.1 level of adaptation.
- 1.2 mechanism of adaptation
- 2 Adaptation to different environment-
- 2.1 Fresh water.
- 2.2 marine water, shores and estuarine water.
- 3 Terrestrial adaptation

Unit-II

1 Adaptation to different environment-

- 1.1 Aerial adaptation
- 1.2 Polar
- 1.3 Desert, cave
- 1.4 Deep sea environment
- 1.5 parasitic habitats

Unit-III

1 stress physiology

- 1.1 Basic concept of environmental stress and strain
- 1.2. Basic concept of elastic and plastic strain.
- 1.3. Acclimatization, acclimation and adaptation.
- 1.4 temperature regulation in endotherms.

Unit-IV

1. structure and function of endocrine glands (pituitary, pancreas adrenal and thyroid)

2. Biosynthesis of (Thyroid and gonadal)

3. Endocrine disorders due to hormones of other glands (Kidney, Heart,

Pineal body and Gonads)

Members of Board of Studies in Zoology

  
2019

  
2019

M. Sc. ZOOLOGY  
July-Dec.2018  
III<sup>rd</sup> Semester

Paper-IV: Biology of Parasitism

Unit-I

Host-parasite relationship.

Transmission of infectious agent.

Protozoan diseases-(Amoebiasis, Giardiasis, Trypanosomiasis, Coccidiasis).

Vectors of human diseases.

Unit-II

Helminth parasites and diseases (Taeniasis, Schistosomiasis).

nematodes parasites and diseases (Ascariasis, Filariasis).

Unit-III

Viral diseases (AIDS, Rababies, Plague,)

Respiratory disease caused by virus & bacteria.

bacterial disease (Tuberculosis).

Unit-IV

Fungal diseases (Mycosis, Mycotoxicosis),

Disease transmitted by ticks and insects (Lyme disease, Malaria, Rickettsiae)

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Lab Course-I (Practical based on paper I & II)

Duration-6 hrs.

Max. Marks-100

Practical based on paper I

35

Study embryological slides of frog and chick.

Study of histological slide of gonads.

Alternative to dissection and display the reproductive system.

Effect of thyroid hormones on metamorphosis of frog.

Window preparation in chick.

Study of complete developmental cycle of snail and frog.

Other Exercise based on theory paper.

Practical based on paper-II

Study of various behavior pattern---

To study the phototactic response and geotaxis behaviour of earthworm

To study the food preference and cleaning behaviour of house fly

To study the web conduction and habituation in spider.

Study of insect behavior in response to various environmental stimuli.

Study of experiment showing animal-animal interaction.

Study of experiment showing animal-plant interaction.

Estimation of body temperature and pulse rate on daily time scale

Estimate the time perception at two different time point.

Experiment on different animal behaviour.

Other Exercise based on theory paper.

Viva-voice.

10

Sessional

20

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July-Dec.2018

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**M. Sc. ZOOLOGY**  
**III<sup>rd</sup> Semester**

Lab Course-I (Practical based on paper III & IV)

Duration-6 hrs.

Max. Marks-100

**Practical based on paper- III -**

- Adoptive modification of feet or claw in birds
- Experimenton Stress physiology and stress scaling
- Adoptive modifications in mouth part of insects
- Study of slides of endocrine glands
- Demonstration of osmosis
- Other Exercise based on theory paper.
- Toxicity Test

**Practical based on paper- IV**

- Study of slides of protozoan parasite.
- Study of slides of helminthes parasite.
- Study of slides of Bacterial, fungal and viral disease.
- Study of rectal content of vertebrate showing parasite.
- Other Exercise based on theory paper.

Viva-voice.

Sessional

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Jan-June, 2019

M.Sc. (IV Semester) Zoology

Paper No.	Title of Paper	Theory	Test	Marks
I	Biology of Immune system	80	20	100
II	Ecology and limnology	80	20	100
III	Ichthyology	80	20	100
IV	Aquaculture and Fisheries	80	20	100
LC-I	Lab Course I (Based on paper I & II)	-	-	100
LC-II	Lab Course II (Based on paper III & IV)	-	-	100
Total				600

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Unit -1

1. Introduction to innate and acquired immune system.
2. Cells of immune system-  
B lymphocytes,  
T-lymphocytes,  
Mononuclear cells  
Granulocytes  
mast cells  
Dendritic cell
3. organs of immune system  
Primary lymphoid organ (Thymus, bone marrow)  
secondary lymphoid organ (Lymph nodes, spleen, MALT, CALT)

Unit -2

1. Immunoglobulin structure and Function.
2. Molecular structure of Ig.
3. Immunoglobulin classes-IgG, IgM, IgE, IgD.
4. Monoclonal antibodies.

Unit-3

1. Antigen-processing and presentation
2. primary and secondary immune defenses
3. Antigen-antibody reaction-
  - 3.1 Antibody affinity and activity
  - 3.2 cross activity
  - 3.3. Agglutination reaction
  - 3.4. precipitation reaction

Unit-4

1. Ageing and immune factor
2. Immuno tolerance.
3. Vaccine and types.
4. Hypersensitivity and its types.

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Unit-I

1. Basic concept of Ecology- Biotic and Abiotic factors. and Limiting factors .
2. Community Ecology.
3. Ecological succession.
4. Energy flow in Ecosystem.
5. Aquatic and terrestrial habitat.

Unit-II

1. Biogeochemical cycles. (water, carbon, oxygen and nitrogen)
2. Natural resources and its conservation (forest, soil, Water and Energy).
3. Wild life conservation.
4. Environmental impact assessment

Unit-III

1. Environmental degradation and pollution-
  - 1.1 Air pollution
  - 1.2 Soil pollution
  - 1.3 Noise pollution
  - 1.4 water pollution
2. Global warming and green house effect.
3. Effect of human population effect on environment

Unit IV

1. ~~Characteristics of water.~~ Characteristics of water
2. Lentic ecosystem-pond ecosystem.
- ~~Eutrophication.~~ Eutrophication
4. Lotic Ecosystem -River stream ecosystem
5. Estuaries

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IVth Semester  
Paper-III Ichthyology

Unit-I

1. Skin and its derivatives in fishes
2. Skeleton in fishes
3. Fins-types structure, modification functions
4. Locomotion,
5. Food, feeding habit and alimentary canal

Unit-II

1. Respiration & accessory respiratory organs
2. Swim bladder, Weberian ossicles.
3. blood heart and Blood vascular system
4. Excretion, Osmoregulation

Unit-III:

1. Nervous system (Brain, spinal cord, cranial nerves.  
Sense organs (eye ear tongue and olfactory)
2. Specialized organ in fishes (Light, sound & Electric production )
3. Reproductive system-Male & female
4. Endocrine gland in fishes

Unit-IV

1. Migration in fishes
2. parental care in fishes
3. Adaptation-
  - 3.1 coloration
  - 3.2 deep-sea fishes
  - 3.3 Hill stream fishes
4. larvivorous fishes
5. Exotic fishes

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IVth Semester  
Paper-IV: Aquaculture and Fisheries

000213

Unit-I

1-General characters, classification, evolution and phylogeny of-

- 1.1-Placodermi,
- 1.2-Holocephali
- 1.3- Elasmobranchi
- 1.4- Dipnoi
- 1.5-Teleostomi

Unit-II

1-Fish culture in fresh water

2-physiochemical condition of water and its effect on fishes.

3-Construction and maintenance of fresh water fish farm, management of ponds.

4-Fresh water fish breeding (Dry & wet bundh breeding and induced breeding).

5-stocking and transport of fish seed and brood fish.

5- Fish cum paddy culture.

Unit-III

1-Composite fish culture

2-integrated fish farming

3- Sewage fisheries

4-prawn fishries

5- Marine fisheries

Unit-IV

1- intensive culture of air-breathing fishes

2- Fish preservation and byproduct.

4-Fish diseases-

4.1-Viral disease

4.2-Bacterial and protozoan disease

4.3-Helminthes parasites

Members of Board of Studies in Zoology

27

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IVth Semester

Lab Course-I (Practical based on paper I & II)

Duration-6 hrs.

Max. Marks-100

Practical based on paper-I

35

Dissection of primary and secondary lymphoid organs from fish/fowl

Preparation and study of cell suspension from spleen (spleenocytes) of fish/fowl

Total and differential count of leucocytes

Protein estimation by lowry's method in normal and infected blood

Determination of blood group Study of permanent slides-(for spotting)

(Squamous, cuboidal, columnar, epithelial, blood, nerve, muscle cells.

various types of connective tissue, adipose tissue

mitotic and meiotic chromosomes and their different phases,

various types of cancer cells etc)

Practical based on paper-II

35

Practical based on paper-II -35

To study of biotic community of pond/grassland ecosystem

Study of biogeochemical cycle by way of models

Visit to some natural habitats and man made habitats to study the human impact on environment

Water analysis- Determination of hardness, turbidity & alkalinity of water sample.

Soil analysis- Determination of chemical composition, physical condition and Cl content of soil.

Members of Board of Studies in Zoology

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July-Dec. 2018

M. Sc. ZOOLOGY

IV<sup>th</sup> Semester

Lab Course II (Based on paper III & IV)

000215

Duration 6 hrs.

Max. Marks-100

**Practical based on paper III**

60

Study of anatomy of representative fishes from museum specimens and from their own collection.

Study of histological slides

Identification of important cultivable species of fishes

Age determination by scales.

Study of Hematological parameters( RBC,WBC,Hb)

Study of osteology of fishes

Alternative method of dissection of fishes –nervous system of fishes.

Alternative dissection of accessory respiratory organs of Heteropetes, fossilis, clarias

webarian ossicles of fish.

other exercises related to theory paper.

**Practical based on paper IV**

Estimation of Hydro biological parameters –Ph,conductivity,salinity dissolved oxygen

Identification of eggs, spawn fry and fingerlings of cultivable fishes in india

Study of Aquarium design and maintenance.

Visit to fish farm to study various fisheries activities at selected centers/site

Demonstration gonadosometric index.

Demonstration of Induced breeding in fishes.

other exercises related to theory paper

**Collection**

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**Viva-voce**

10

**Sessional**

20

**Members of Board of Studies in Zoology**

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शासकीय हरीसगढ़ जे. योगानंदम् महाविद्यालय, रायपुर (छ. में) दिनांक 17.07.2018 को अध्ययन मण्डल की बैठक आयोजित हुई। जिसमें B.Sc. (I, II, III) एवं M.Sc. मानव विज्ञान (III सेमेस्टर, IV सेमेस्टर) के पाठ्यक्रम निर्धारित करने संबंधित चर्चा की गई। बैठक में निम्नलिखित बिंदुओं पर चर्चा एवं निर्णय किया गया -

- (1) बैठक में सत्र - 2018-19 के लिए बी.एस.सी. (I, II, III वर्ष) के पाठ्यक्रम के निर्धारण पर विचार किया गया।
- (2) बैठक में सत्र 2018-19 के लिए एम.एस.सी. मानव विज्ञान (III semester एवं IV semester) के लिए पाठ्यक्रम के निर्धारण पर विचार किया गया।
- (3) बैठक में सर्वसम्मति से यह निर्णय लिया गया कि विश्वविद्यालय अनुदान आयोग के मॉडल पाठ्यक्रम के प्रावधानानुसार एम.एस.सी. III सेमेस्टर एवं IV सेमेस्टर का निर्धारण किया जाएगा तथा वि.वि. अनुदान आयोग के गॉइड लाइन का पालन सुनिश्चित किया जाएगा।
- (4) प्रत्येक सेमेस्टर में 04 प्रश्नपत्र सैद्धांतिक विषय से संबंधित एवं 02 प्रश्नपत्र लैब वर्क से संबंधित होंगे। इसमें अधिकतम अंक 100 निर्धारित किया गया है, जिसमें 80 अंक प्रश्नपत्र में एवं 20 अंक आंतरिक मूल्यांकन अंक होंगे।
- (5) स्नातक एवं स्नातकोत्तर पाठ्यक्रमों के अध्ययन उपरान्त प्राप्त होने वाले संभावित परिणामों (outcomes) पर चर्चा कर अनुमोदन किया गया।

इस प्रकार सर्वसम्मति से बी० एस्० सी०  
(मानव विज्ञान) एवं एम० एस्० सी० (मानव विज्ञान) के  
पाठ्यक्रमों का निधखिन्दा किया गया।

1. प्रो० मितानी मिश्रा 17/7/2018
2. प्रो० अशोक प्रधान - 17/7/2018
3. प्रो० डी० के० वर्मा - 17.7.2018
4. डॉ० नीरजा सेन - 17/7/2018
5. डॉ० संपदा वर्मा - 17.7.2018

**M.Sc. Anthropology**  
**Semester -III**  
**Paper- I**  
**Advanced Human Biology**

**Max. Marks-80**  
**Min.Marks-27**

**Unit I**

Gene Expressivity : Lethal gene, Sub-lethal gene, Modifying gene, Co-dominance,  
Penetrance in Man  
Sex Determination in Man

**Unit II**

Probability  
Hardy-Weinberg Equilibrium and its applications  
Polymorphism: Transient and Balanced  
Concept of Gene Pool and Gene Frequency  
Mating Pattern: Random mating, Assortative mating

**Unit III**

Human Chromosomes, Chromosome Karyotype-Banding Techniques  
Numerical and Structural Chromosomal abnormalities  
Inborn errors of Metabolism: G6PD Deficiency, Phenylketouria, Alkaptonuria

**Unit IV**

Occurrence of Mutation: Mutation Rate- Direct and Indirect Method  
Selection in Human Population  
Inbreeding with Pedigree  
Coefficient of Inbreeding  
Genetic Hazards of radiation

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*Shree Anil*  
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*1/27/18*

**M.Sc. Anthropology**  
**Semester- III**  
**Paper- II**  
**Human Growth and Nutrition**

**Max. marks-80**

**Min.marks -27**

**Unit-I**

Human Growth and Development: Pre-Natal And Post-Natal Growth, Infancy, Childhood, Adolescence, Adulthood, Senility.

Human Growth Curves.

Basic Methods of Growth Studies: Cross-Sectional, Longitudinal, Mixed Longitudinal

**Unit- II**

Factors Affecting Growth: Heredity, Environment, Hormones

Concept of Ageing :- Skeletal, Dental, Morphological changes

**Unit- III**

Nutrition: Basic Terms and Concepts

Concept of Balanced Diet, Malnutrition, Under Nutrition, Over Nutrition, Obesity.

Special Problems Related to Growth And Nutrition; Infants, Pregnant And Lactating Mothers, Old Age Problems

Birth Weight Variation, Abnormal Growth Failure.

Evaluation of Nutritional Status Through Anthropometric And Clinical Signs of Malnutrition.

**Unit-IV**

Growth Programmes;-ANP, ICDS, SNP, Mid-day meal Programme,

Vitamin-A prophylaxis Programme, Anemia Prophylaxis Programme, Goiter control programme

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Nutritional deficiency diseases: Nicotinic acid deficiency, Vitamin- C & Vitamin -D Deficiency

Problems of Malnutrition, Morbidity and Mortality in India, IMR

Role of Maternal Education, Immunization Programme in India

**Recommended Readings:**

1. Tanner, J.M. 1962. Growth at adolescence, Blackwell Scientific Publications, Oxford
2. Lowrey, G.H. 1978. Growth & development of children, Year book medical publishers, Chicago-London
3. Swaminathan, M. 1985. Essentials of food and nutrition, The Bangalore Printing and publishing Co. Ltd
4. Gopalan, C., Rama Sastri, B.V. & Balasubramanian, S., C. 2002. Nutritive value of Indian foods, National Institute of nutrition, ICMR, Hyderabad
5. Parasmani dasgupta and Roland Haupie, 2001. Perspectives in Human Growth, development and maturation, Kluwer Academic Publishers, London.
6. Marshall, W.A. 1977. Human Growth and its disorders, Academic Press, London
7. Harrison, G.A., Weiner, J.S. Tanner, J.M. and Barnicot, N.A. Human Biology: An introduction to human evolution, variation and growth, Clarendon Press, Oxford
8. Tanner, J.M., Foetus into man
9. Jelliff, D.B., Community nutritional assessment with special reference to less developed countries
10. Dixit. Human nutrition; Principles and applications in India
11. Shanti, G. Nutrition and child care: A practical guide.
12. B. Srilaxmi, Nutrition Science
13. Margrat Schay, Nutrition
14. Rao, V.K.R.V. Food nutrition and poverty
15. Nelson, A text book of pediatrics
16. Garrow, J.S. and James, W.P.T: Human nutrition and dietetics
17. Swaminathan, M., Essentials of food and nutrition: Applied aspect
18. Eveleth, PB and Tanner, JM Worldwide variation in human growth
19. Forbes, GB, Human Body Compositio

**M.Sc. Anthropology**  
**Semester III**  
**Paper III**  
**Theory and Methods in Socio-Cultural Anthropology**

**Max.Marks-80**  
**Min.Marks-27**

**Unit: I**

Evolutionary School of Thought: Classical and Neo-evolutionism: Contribution of Morgan, Tylor, Leslie White, and Julian Steward  
 Diffusionists School of Thought: Elliot Smith, F.W. Schmidt  
 American Diffusionism: Culture Area Approach- Clark Wissler, A.L. Kroeber  
 Historical Particularism & Culture Relativism: F.Boas

**Unit: II**

Functional School Of Thought: B.Malinowski  
 Structural-Functionalism: Redcliffe Brown  
 Social Organization: Raymond Firth  
 Psychological Anthropology: Culture and Personality School Of Thought- Ruth Benedict, Margret Mead, Ralph Linton, Kardiner, Cora-Du-Bois

**Unit: III**

Historical and Dialectical Materialism: Marx And Engels  
 Concept of Culture: A.L.Kroeber  
 Concept of Peasant Society: Robert Redfield

**Unit: IV**

Fieldwork and Ethnography  
 Universalization and Parochialization: Marriott's Concept  
 Concept of Unity And Extension: M.Opler  
 Concept of Rural Cosmopolotanism: Oscar Lewis

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**M.Sc. Anthropology**  
**Semester III**  
**Paper: IV**  
**Tribal Development**

**Max.marks-80**  
**Min.marks-27**

**Unit: I**

Definition of Tribe, Scheduled Tribe and Primitive Tribal Groups  
Classification and Characteristics of Indian Tribal Regions  
Racial and Linguistic Classification of Tribes  
Impact of Civilized Societies on Tribal Languages and Traditions  
History of Tribal Development in India

**Unit: II**

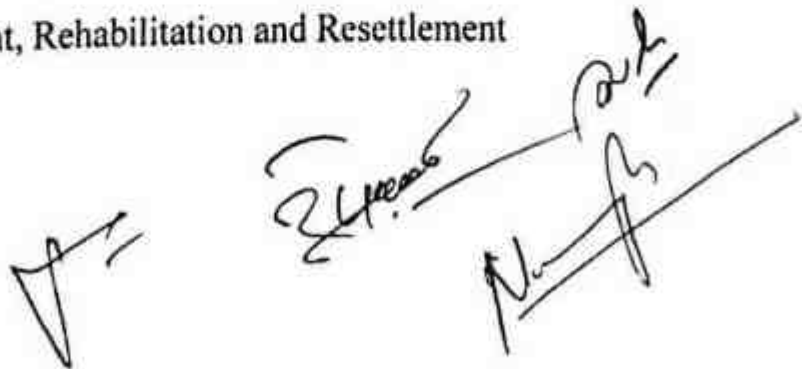
Indian Constitution- Safeguard And Provisions For Schedule Tribes, Schedule  
Castes & Others  
Administration of Schedule Areas (Fifth Schedule)  
Tribal Areas (Sixth Schedule)  
Role of Anthropology In Tribal Development

**Unit: III**

Policies, Planning and Programmes for Tribal Development: Scheduled Tribes in  
Five Year Plans, Special Multipurpose Plans, Tribal Sub plan, Integrated Tribal  
Development Programme etc  
Impact of Industrialization, Urbanization and Globalization  
History of Tribal Movement in India with Special Reference to Chhattisgarh

**Unit: IV**

Tribal Economy and Forests: Forest Policy and Tribes, Joint Forest Management,  
Forest Right  
Industrial Development, Rehabilitation and Resettlement



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**M.Sc. Anthropology**  
**Semester III**  
**Lab Course- I**  
**Practical in Human growth, nutrition and Physiology**

**Max. marks-80**  
**Min.marks -27**

1. Detection of Nutritional Status on the Basis of Body Measurements:  
Nutritional Anthropometry: Ht/Age, Wt/ Age, Wt/ Ht ,Body Mass Index, Waist/ Hip Ratio.
2. Physiology:  
Examination of Pulse Rate  
Determination of Blood Pressure  
Determination of Vital Capacity  
Hand Grip

**Recommended Readings:**

1. Jelliffee, D.B.& Jelliffee, E.F.B. Nutrition & Growth, New York, Plenum
2. Swaminathan, M. 1985. Essentials of food and nutrition
3. Gopalan, C, Rama Sastri, B. V.,& Balasubramanian, S.C.2002. Nutritive value of India foods, National Institute of Nutrition, ICMR, Hyderabad
4. Falkner, F. & Tanner, J.M. Human Growth, Plenum Press, New York





**M.Sc. Anthropology**  
**Semester III**  
**Lab Course: II**  
**Practicals in Museum based Material Culture**

**Max. marks- 80**

**Min.marks-27**

1. Basic Understanding of Museum
2. General Knowledge about Various Museums
3. Social, Culture And Educational Role of Museum
  
4. Draw and Describe the Ethno- Musicological Specimen
  - A. Housing Pattern
  - B. Agricultural Equipments
  - C. Fishing, Hunting and Fire Appliances
  - D. Musical Instruments and Ornaments

**Recommended Readings:**

1. Agnihotri, V. 2003, Manav aur Uski Bhoutik Sanskriti (in hindi), K.K. Publications, Allahabad
2. Basu, T.M; Indian Museum Movement; A.K. Banerjee 89, Mahatma Gandhi Road, Calcutta 7
3. Bijay K. Behara & Subodh K. Mohanty; Museology and Museum Management in India. Mayur Publication, Bhubneswar
4. Choudhary, J; The Ethnographical Collection and Their Display



**M.Sc Anthropology**  
**Semester IV**  
**Paper: I**  
**Indian Anthropology**

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**Max. Marks: 80**

**Min. Marks: 27**

**Unit: I**

Indian Anthropolgy : Various Dimensions  
Growth of Indian Anthropology  
Some Indian Anthropologists and their Contribution: L.P.Vidyarthi, S.C.Dude,  
M.N.Shrinivas, B.K.Roy Burman

**Unit: II**

Folf Society, Peasant Society, Urban Society, Folk-Urban Continuum  
Little Tradition, Great Tradition  
Universalization & Parochialization  
Sacred Complex  
Tribe- Caste Continuum  
Nature-Man-Spirit Complex

**Unit: III**

Bases of Indian Social System: Varna, Jati, Ashram, Purushartha, Rin, Karma  
Impact of Buddhism, Jainism, Islam & Christianity on Indian Society

**Unit: IV**

Sanskritization, Weternization, Secularization, Modernization  
Dominant Caste, Issues Related to National Integration

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**M.Sc. Anthropology**  
**Semester IV**  
**Paper II**  
**Disaster Management, Displacement & Rehabilitation**

**Max. Marks- 80**  
**Min. Marks- 27**

**Unit: I**

Disaster Management: Meaning, Scope, Nature and Importance of Disaster Management

Disaster Management Cycle

Types of Disaster: Natural Disaster and Man-Made Disaster

**Unit: III**

Types of Natural Disaster

Hydrological Disaster: Flood, Drought, Cloud Burst

Geological Disaster: Earthquakes, Tsunamis, Landslides, Volcanic Eruptions

Wind Related Disaster: Cyclone, Storm, Tidal Waves, Heat and Cold Waves

Biological Disaster: Epidemics

**Unit: III**

Types of Man-Made Disaster

Pollution- Air Pollution, Water Pollution and Radiological Pollution

Deforestation, Global Warming and Ozone Depletion

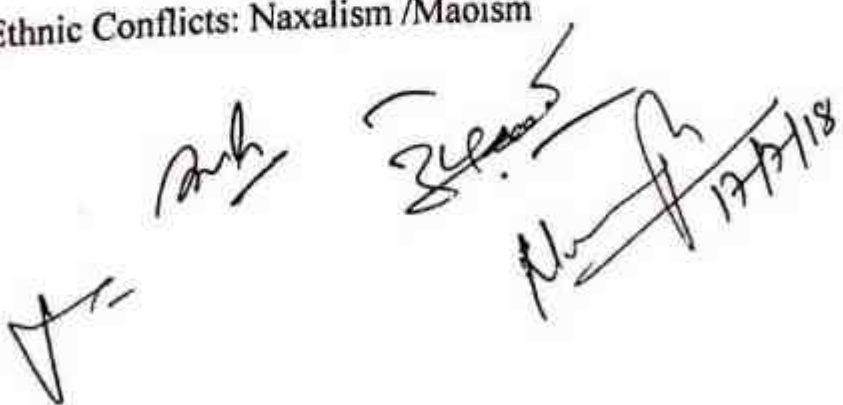
**Unit: IV**

Displacement & Rehabilitation Policies for Disaster Management

Role of Different Organizations In Rehabilitation: Role Of Government NGOs and

Local Institutions

Terrorism in India, Ethnic Conflicts: Naxalism /Maoism


  
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**M.Sc. Anthropology**  
**Semester-IV**  
**Paper III**  
**Applied Anthropology**

**Max. marks- 80**  
**Min. Marks- 27**

**Unit: I**

Meaning and Scope of Applied Biological Anthropology  
Anthropology of Sports  
Nutritional Anthropology  
Designing of Defence Equipments  
Defense Services

**Unit II**

Applications of Human Genetics: Medico-Legal Cases, Eugenics  
Genetic Screening, Genetic Counseling, Genetic Engineering  
Human Genomics & Its Applications

**Unit III**

Meaning & Scope of Applied Social Anthropology  
Applied & Action Anthropology  
Applications of Anthropological Theory and Methodology in the Field of Tribal  
Development

**Unit IV**

Applied Anthropology in Industry  
Applied Anthropology in Education  
Applied Anthropology in Public Health  
National Health Programme

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**M.Sc. Anthropology**  
**Semester IV**  
**Paper IV**  
**Development Anthropology**

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**Max. Marks-80**  
**Min. Marks- 27**

**Unit: I**

Meaning and Definitions of Plan and Planning  
Meaning and Definitions of Development, Dimensions of Development  
Development: Theories and Models of Development  
Moral/Ethical Issues and Limitations of Development Anthropology

**Unit: II**

Indicators of Development, Factors Supporting Development, Impediments to  
Development  
Agencies of Development: Governmental, Non Governmental and International  
Agencies

**Unit: III**

Women Development in India: Programmes for Women Development  
Ageing in India  
Provision of Right to Life in Indian Constitution  
Schedule Caste: Special Component Plan

**Unit: IV**

Rural Development in India: Historical Background  
Special Programmes for Poverty Alleviation, Panchayati Raj Institutions, Land  
Reform  
Sustainable Development: Environment, Natural Resources

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M.Sc. Anthropology  
Semester IV  
Lab Course I  
Practical in Applied Biological Anthropology

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Max. Marks-80

Min. Marks- 27

1. Demetoglyphics: Methods of taking finger and palm prints, Applications and Analysis
2. Techniques of blood grouping: ABO blood group system, Rh blood group system and MN blood group system. Personal identification by blood grouping. Calculation of gene frequencies
3. PTC taste Sensitivity: Inheritance and Significance
4. Laboratory examination of blood and blood stains for criminal detection: Preliminary test, Confirmatory test: Tiechmamm test, Takayama test
5. Test of Heamoglobin determination in human blood
6. Examination of R.B.C. in human blood
7. Examination of W.B.C. in human blood

**Note:** Five specimens to be analyzed by each student in the above mentioned traits unless stated otherwise

MB  
V  
S. S. S.  
N. S. S.  
12/12/18

IV Semester

Field Based Project Report

Max. Marks-100  
Min. Marks- 33

In this lab course students are required to undertake a project work consisting of approximately 2 week preparatory work, 4 week of field investigation or lab work and data analysis for completion of project work.

The project report will be selected in consultation with the faculty members decided by Head of the department, according to their specialization. Project work will typically be a document of about 20-50 pages with section of the following sequence: Introduction, Objectives, Hypothesis (if necessary), Research Design/ Methodology, Result, Discussion, Conclusion and Suggestions, Literature cited etc. Presentation and Viva- Voce of the Project work will be in the presence of External examiner and faculty of the department.

Two typed copies of analyzed data are to be submitted in the department in the form of project Report.

*Handwritten signatures and dates:*  
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A signature above "12/11/18"  
A signature above "12/11/18"

रसायन शास्त्र विभाग 3.7.2018

शास्त्र. जे. गोदानन्दन धर्तीसंगठ महाविद्यालय, रामपुर (ख.ग.)  
आज दिनांक 3.7.2018 को दिन के 12.00 बजे  
रसायन शास्त्र अध्यायन मण्डल की बैठक हुई, जिसमें  
निम्नोलाखित सदस्य उपस्थित रहे।

- (1) डॉ. श्रीमती शैलजा निगम, प्राध्याग, शासकीय महाविद्यालय  
कोरवा, तिलरा-गेवरा, जिला-रामपुर  
*Jaliganw 03/07/18 3:30 PM*
- (2) डॉ. मनीषा मिश्रा, प्राध्यापक, शास. इं. के. महेला मरा.  
रामपुर (ख.ग.)  
*Ashra*

- (3) डॉ. अनुपमा अस्थाना, प्राध्यापक, कला एवं विज्ञान  
जगतकौन्डर महाविद्यालय, दुर्ग, (ख.ग.)  
*Ashra 03/07/18*

- (4) डॉ. राम दुबे, प्राध्यापक, शास. धर्तीसंगठ महाविद्यालय, रामपुर  
*Ashra*

- (5) डॉ. पी. के. आम्बिहोत्री, प्राध्यापक, शास. धर्ती  
महाविद्यालय  
*Ashra*

- (6) डॉ. श्रीमती प्रतिभा चन्द्राकर, प्राध्यापक, शास. धर्तीसंगठ  
महाविद्यालय, रामपुर (ख.ग.)  
*Ashra 03.7.18*

- (7) डॉ. श्रीमती प्रतिभा चरवी, सहा. प्राध्यापक, शास. धर्ती.  
महाविद्यालय, रामपुर (ख.ग.)

- (8) श्रीमती अनुराधा चौधरी, सहा. प्राध्यापक, शास.  
धर्तीसंगठ महाविद्यालय, रामपुर, (ख.ग.)  
*Anuradha 03-07-18*

बैठक में शासकीय धर्तीसंगठ महाविद्यालय, रामपुर, की  
सदस्यों काश्यामों (जे.एस.सी. 7, 8 व 9) के लिए  
सन 2018-19 के रसायन शास्त्र के पाठ्यक्रम पर विचार  
विमर्श किया गया एवं सर्व सम्मति से निर्णय लिया  
गया कि पं. रविशंकर शुक्ल विश्वविद्यालय द्वारा सन 2018-19  
के लिए रसायन शास्त्र विषय का जो पाठ्यक्रम निर्धारित  
किया गया है उसे मंजूर, लागू किया जाये।

- (1) डॉ. शैलजा निगम - *Jaliganw 03/07/18 3:20 PM*

- (2) डॉ. मनीषा मिश्रा - *Ashra 03-7-18*

- (3) डॉ. अनुपमा अस्थाना - *Ashra 3/7/2018*

- (4) डॉ. राम. दुबे - *Ashra*

- (5) डॉ. पी. के. आम्बिहोत्री - *Ashra*

- (6) डॉ. प्रतिभा चन्द्राकर - *Ashra*

- (7) डॉ. प्रतिभा चरवी - *Ashra 03.07.18*

- (8) श्रीमती अनुराधा चौधरी - *Anuradha 03.07.18*





वैद्य में समाप्त - जी. समाप्त समाप्त सेमेस्टर I, II, III एवं IV के पाठ्यक्रम की निश्चितता वर्ष 2018-19 के लिए विभाजित प्रस्तावित है।

(1) समाप्त - जी. समाप्त सेमेस्टर - I वर्ष 2018-19

(i) इस सेमेस्टर के लिये Paper I, II, III एवं IV के पाठ्यक्रम विगत वर्ष 2017-18 के समाप्त सेमेस्टर (i) के आधुनिकीकरण की दिनांक 30-10-2017 के समाप्त सेमेस्टर में अनुसूचित विभाजन है।

(ii) सेमेस्टर-I के Lab Course - I के पाठ्यक्रम में भी परिवर्तन रहेगा।

(iii) सेमेस्टर-1 के Lab Course - II  
 Polarity, Conductivity, Potentiometric / pHmetry के संबंधित 80 experiments के साथ Lab Course - VIII के समाप्त सेमेस्टर में समाप्त है।

(2) समाप्त - जी. समाप्त सेमेस्टर - II वर्ष 2018-19

(i) इस सेमेस्टर-II के Paper-I के Unit-I के अंतर्गत "Kinetics of ligand substitution reaction in tetrahedral complexes" की हटाया जाना प्रस्तावित है। जोध साथ

(ii) इसी के पाठ्यक्रम परिवर्तन रहेगें।

(iii) सेमेस्टर-II के Paper-II एवं Paper-III के सभी पाठ्यक्रम परिवर्तन रहेगें।

(iv) सेमेस्टर-II के Paper-IV के Unit II में C से हटाया गया कि इस Unit के केवल दो भाग A एवं B होंगें।

(v) सेमेस्टर-II के Lab Course - III एवं IV में कोई परिवर्तन प्रस्तावित नहीं है। पाठ्यक्रम परिवर्तन रहेगा।

3. समाप्त - जी. समाप्त सेमेस्टर - III वर्ष 2018-19

सेमेस्टर -

(i) सेमेस्टर - III के पाठ्यक्रम का प्रस्तावित विभाजन है -

Paper	Unit-I	UNIT-II	UNIT-III	UNIT-IV
I	Orgo Alkyls & Aryls of Tr. metals	Compd of Tr. Metal Complex	Tr. Metal $\pi$ -Complex	Homogeneous Catalysis
	Functional Organo metallic Compds	M-C Multiple bonds		Tr. Metal compds with Coord. H

Name of Paper I - ~~Organometallic~~  
 Organotransition Metal Chemistry.

Paper - II - Natural Products

Unit-I	Unit II	Unit III	Unit-IV
Terpenoids & Carotenoids	Alkaloids	Steroids & Hormones	plant Pigments & Porphyrins Porphyrins

Paper - III Kinetics, Photo & Solid State Chem

I	II	III	IV
Kinetics of Composite Reaction	Kinetic Isotopic Effect Solvent Effect	Photochemical Reaction Dehydrogenation miscellaneous photo reaction	Solid State Acetals

Paper IV Spectroscopy -

I	II	III	IV
UV-Visible	Atomic Spectroscopy Molecular Spectroscopy	Photoelectronic Photoacoustic Spectroscopy	Mass Spectrometry & Flame Emission

Lab Course - V : Organic Practical

- ④ Multi-step Synthesis ⑤ Quantitative Organic Analysis  
 ⑥ Estimation of functional gp ⑦ Extraction of compounds

Lab Course - VI

- ⑧ Spectrophotometric det<sup>n</sup> ⑨ pH ⑩ Polarography  
 (D) Flame Photometric det<sup>n</sup> (E) Refractometry  
 (F) Separation & Estimation (G) Advanced level

Semester IV

Paper-I Bioinorganic Chemistry

I	II	III	IV
Metal Storage, Transport and Bio-mineralization Na <sup>+</sup> K <sup>+</sup> pump Calcium metals in medicine	Bioenergetics/ATP Electron Transfer in Biology Transport & storage of O <sub>2</sub>	Metallo enzymes Enzyme models	Enzymes Co enzymes Biotechnological Application of enzymes

Paper-II Medicinal Chemistry

I	II	III	IV
Drugs & Drugs Design	Pharmacokinetics Pharmacodynamics	Antibiotics Antimicrobial	Local anti-infective drugs Antineoplastic drugs

Paper-III Environmental Chemistry

I	II	III	IV
Environment Industrial pollution	Hydrosphere Soils	Atmosphere Analysis of Air pollution	Analysis of water pollution & Soil pollution

Paper IV Analytical Chemistry

I	II	III	IV
Analytical Chem. Errors & Evaluation	Analysis of body fluids Drug Analysis	Food Analysis	Fuel Analysis

Lab Course - VII Inorganic Chemistry

- A - Quantitative Analysis 3 components  
 B Analysis of Alloys, ores and minerals  
 C Inorg. React<sup>n</sup> Mechanism  
 D Preparations  
 E Bioinorganic chemistry

Lab Course - VIII Physical Chemistry

Total 15 experiments related to the Radioactivity, kinetics, Solubility Products, Saponification, pKa, Dissociation constant, phetlysin, Catalytic coefficient, Polarimetry, Conductometry, Potentiometry and pH meter

बैठक में M.Sc. Chemistry Sem I एवं Sem II, <sup>सत्र 2018-19</sup> के पाठ्यक्रमों पर प्रस्तावित आंशिक संशोधनों को अनुमोदित किया गया।

M.Sc. Chemistry Sem-III एवं Sem IV सत्र 2018-19 में लिखे प्रस्तावित पाठ्यक्रमों (वैकल्पिक एवं आमेरिग) को अनुमोदित किया गया।

Prakash Adarsh Suligam Prakash  
10/10/18 10/10/18 10/10/18 10/10/18

Meehan Adarsh M Amrinder  
10/10/18 10/10/18 10/10/18 10/10/18

# Government J. Yoganandam Chhattisgarh College, Raipur

## M.Sc. Chemistry

### EXAMINATION SCHEME

M.Sc. examination will be conducted in four SEMESTERS. Each semester exam shall consist of FOUR THEORY PAPERS AND TWO LAB COURSES.

#### SEMESTER-III (20 CREDIT)

##### THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH-13	Organotransition Metal Chemistry	4	3 Hrs	20	80	100
CH-14	Natural Products	4	3 Hrs	20	80	100
CH-15	Kinetics, Photo & Solid State Chemistry	4	3 Hrs	20	80	100
CH-16	Spectroscopy	4	3 Hrs	20	80	100

##### PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH-17	Lab Course-V Organic Chemistry	2	8Hrs	100
CH-18	Lab Course-VI Analytical Chemistry	2	8Hrs	100

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**M.Sc. CHEMISTRY SEMESTER-III**  
**PAPER-I**  
**ORGANOTRANSITION METAL CHEMISTRY**

**Max. Marks 80**  
**Min. Marks 16**

**Unit - I**

**Alkyls and Aryls of Transition Metals**

Types, routes of synthesis, stability and decomposition pathways, organocopper in organic synthesis.

**Fluxional Organometallic Compounds**

Fluxionality and dynamic equilibria in compounds such as  $\eta^2$  - olefin,  $\eta^3$  - allyl and dienyl complexes

**Unit - II**

**Compounds of Transition Metal-Carbon Multiple Bonds**

Alkylidenes, alkylidynes, low valent carbenes and carbynes - synthesis, nature of bond structural characteristics, nucleophilic and electrophilic reaction on the ligands, role in organic synthesis.

**Unit - III**

**Transition Metal  $\pi$  - Complexes**

Transition metal  $\pi$  - complexes with unsaturated organic molecules, alkenes, alkynes, allyl, diene, dienyl, arene and trienyl complexes, preparations, properties, nature of bonding and structural features. Important reactions relating to nucleophilic and electrophilic attack on ligands and to organic synthesis.

**Unit - IV**

**Homogeneous Catalysis**

Stoichiometric reactions for catalysis, homogeneous catalytic hydrogenation, Zeiglar-Natta polymerization of olefins, catalytic reactions involving carbon monoxide such as hydrocarbonylation of olefins (oxo reaction), oxopalladation reactions, activation of C-H bond.

**Transition Metal Compounds with Bonds to Hydrogen**

Transition metal compounds with bonds to hydrogen.

**LIST OF REFERENCE BOOKS:**

1. Principles and Application of Organotransition metal Chemistry, J.P. Collman, L.S. Hegsdus, J.R. Norton, and R.G. Finke, University Science Books.
2. The Organometallic chemistry of the transition metals, R.H. Crabtree, John Wiley.
3. Metallo - organic chemistry, A.J. Pearson, Wiley.
4. Organometallic chemistry, R.C. Mehrotra and A. Singh, New age International.

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Ashu, S. Singh, Anand, Anand

## PAPER- II

## NATURAL PRODUCTS

Max. Marks 80

Min. Marks 16

## Unit- I

**Terpenoids and Carotenoids**

Classification, nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule. Structure determination, stereochemistry, biosynthesis and synthesis of the following representative molecules: Citral, Geraniol,  $\alpha$ -Terpeneol, Menthol, Farnesol, Zingiberene, Santonin, Phytol, Abietic acid and  $\beta$ -Carotene.

## Unit - II

**Alkaloids**

Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on nitrogen heterocyclic ring, role of alkaloids in plants, synthesis and biosynthesis of the following: Ephedrine, (+)-Coniine, Nicotine, Atropine, Quinine and Morphine.

## Unit - III

**Steroids and Hormones**

Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereo chemistry. Isolation, structure determination and synthesis of Cholestrol, Bile acids, Androsterone, Testosterone, Estrone, Progesterone, Aldosterone. Biosynthesis of steroids.

## Unit IV

**Plant Pigments & Porphyrins**

Occurrence, nomenclature and general methods of structure determination. Isolation and synthesis of Apigenin, Luteolin, Quercetin, Cyanidin, Hirsutidin. Biosynthesis of flavonoids

**Porphyryns**

Structure and Synthesis of haemin and chlorophyll

Ashu

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## LIST OF REFERENCE BOOKS:

1. Natural Products: Chemistry and Biological Significance, J. Mann, R.S. Davidson, J.B. Hobbs D. V. Banthrope and J.B. Harbrone, Longman, Essex.
2. Organic Chemistry, Vol. 2, I.L. Finar, ELBS
3. Stereoselective Synthesis: A Practical Approach, M. Nogradi, VCH.
4. Rodd's Chemistry of Carbon Compounds, Ed. S. Coffey, Elsevier.
5. Chemistry, Biological and Pharmacological Properties of Medicinal Plants from the Americas, Ed. Kurt Hostettmann, M.P. Gupta and A. Marston, Harwood Academic Publishers.
6. Introduction to Flavonoids, B. A.Bohm, Harwood Academic Publishers.
7. New Trends in Natural Product Chemistry, Atta-ur-Rahman and M.I. Choudhary, Harwood Academic Publishers.
8. Insecticides of Natural Origin, Sukh Derv, Harwood Academic Publishers.

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M.Sc. CHEMISTRY SEMESTER-III  
PAPER-III  
KINETICS, PHOTO & SOLID STATE CHEMISTRY

Max. Marks 80  
Min. Marks 16  
60 Hours

Unit - I

**Kinetics of Composite Reactions**

Types of composite mechanism, rate equation for composite mechanisms- simultaneous and consecutive reactions, microscopic reversibility, some inorganic mechanisms- formation and decomposition of phosgene, nitrogen pentoxide and ozone, thermal para-ortho hydrogen conversion, hydrolysis of ester and amide; gas phase combustion.

Unit - II

**Kinetic Isotopic Effect**

Theory of isotopic effects. Primary and secondary kinetic isotope effects. Heavy atom isotope effects, Tunneling effect. Kinetic solvent effects.

**Solvent Effect**

Some aspect of solvent structure, classification of solvents, qualitative theory of influence of solvent on reaction rate. Solvent effect in terms of dielectric constant, Grunwald - Weinstein parameter, Z and E values, Application of solvent polarity, Koppel - Palm treatment.

Unit - III

- A. PHOTOCHEMICAL REACTION:** Interaction of electromagnetic radiation with matter, types of excitations, fate of excited molecule, quantum yield, transfer of excitation energy, Actionmetry.
- B. DETERMINATION OF REACTION MECHANISM:** Classification, rate constants and life times of reactive energy states- determination of rate constants of reactions. Effects of light intensity on the rate of photochemical reactions.
- C. MISCELLANEOUS PHOTOCHEMICAL REACTIONS:** Photo - Fries reactions of anillides, Photo - Fries rearrangement. Barton reaction. Singlet molecular oxygen reactions.

Unit - IV

- A. SOLID STATE CHEMISTRY:** Crystal defects and Non - stoichiometry - perfect and imperfect crystals, intrinsic and extrinsic defects - point defect, line and plane defects, vacancies - Schottky defects and Frankel defects. Thermodynamics of Schottky and Frenkel defect, formation of color centers, non - stoichiometry and defects.
- B. METALS - Insulators and Semiconductors, Electronic structure of solids - Band Theory.**

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PAPER-IV  
SPECTROSCOPYMax. Marks 80  
Min. Marks 16

## Unit - I

**Ultraviolet and Visible Spectroscopy:**

Instrumentation and Sample handling various electronic transitions (185 - 800nm) Beer - Lambert law, effect of solvent on electronic transitions, ultra-violet bands for carbonyl compounds, dienes, conjugated polyenes, Fieser - Woodward rule for conjugated dienes and carbonyl compounds, ultra - violet spectra of aromatic and Heterocyclic compounds, steric effect in biphenyls.

## Unit - II

**Atomic Spectroscopy:**

Energy of Atomic orbitals, Vector Representation of momenta & Vector - coupling, spectra of Hydrogen atom, alkali metal atom.

**Molecular Spectroscopy:**

Energy levels, molecular orbitals, vibration transition, vibrational progressions and geometry of the excited states, Franck - Condon principle, electronic spectra of polyatomic molecules, Emission spectra.

## Unit - III

**Photo Electronic Spectroscopy:**

Basic principle: photo-electric effect, Ionization process, photoelectron spectra of simple molecules, ESCA, chemical information of E.S.C.A., Auger Electron Spectroscopy - basic idea.

**Photo acoustic Spectroscopy:**

Basic principles of photo acoustic spectroscopy (PAS), PAS gases and condensed systems, chemical and surface applications.

## Unit - IV

**Mossbauer Spectroscopy:**

Basic principles, spectral parameters and spectrum display. Application of the technique to the studies of (1) bonding and structures of  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$  compounds including those of intermediate spin, (2)  $\text{Sn}^{2+}$  and  $\text{Sn}^{4+}$  compounds - nature of M - L bond coordination number, structure and (3) Detection of oxidation state and inequivalent MB atoms.

**Flame Emission Spectroscopy:**

Theory, instrumentation and application of flame photometer, Factors affecting intensity of emitted radiation, Interferences in flame photometry.

Ashu

S. Nigam

J. B. S.

P. B. S.

S. Nigam

## LIST OF REFERENCE BOOKS:

1. Spectroscopy by Dr H. kaur, Pragati Prakashan.
2. Modern Spectroscopy J.M. Hollas, Johan Wiley.
3. Molecular Spectroscopy, Banwell, Tata Mc Graw – Hill.
4. Symmetry & Spectroscopy of molecules, K. Veera Reddy, New Age International.
5. An Introduction to Spectroscopy, S.S. katra, Anusandhan Prakashan.
6. Introduction to Photoelectron Spectroscopy, P.K. Gosh, John Wiley.
7. Fundamentals of Photochemistry, K.K. Rohtagi - Mukherji, Wiley- Eastern.
8. Molecular Photochemistry, N.J, Turro, W.A. Benjamin.
9. Photochemistry, R.P. Kundall and A Gilbert, Thomson Nelson.
10. Introductory Photochemistry, A. Cox and T.Camp, McGraw – Hill.

M Ashra

and

Salique Asiri  
Mr B Anwarulha  
U. Ali

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**THIRD SEMESTER**  
**Organic Practical**  
**Laboratory Course -  V**

**Max. Marks 100**

**A. MULTI - STEP SYNTHESIS OF ORGANIC COMPOUNDS**

1. Beckmann rearrangement :Benzanilide from benzene  
(Benzene Benzophenone Benzophenone oxime Benzanilide)
2. Benzilic Acid rearrangement :Benzilic acid from Benzoin  
(Benzoin Benzil Benzilic acid)
3. Skraup's synthesis (Synthesis of heterocyclic compounds)  
Quinoline from o - Amino Phenol.
4. p-Bromoaniline from Aniline  
(Aniline Acetanilide p - Nitroacetanilide p - Bromoaniline)
5. p -Nitroacetanilide from Acetanilide  
(Aniline Acetanilide p Nitroacetanilide p - Nitroaniline)
6. m-Nitroaniline from Benzene  
(Benzene Nitrobenzene m - dinitrobenzene m - nitroaniline)
7. Acridone from Anthranilic acid  
(Anthranilic acid o - Chlorobenzoic acid N - Phenylanthranilic acid Acridone)
8. Enzymatic Synthesis  
Enzymatic reduction: Reduction of ethylacetoacetate using Baker's yeast to yield enantiomeric excess of S (+) ethyl - 3 -hydroxybutanone and determine its optical activity.

**B. QUANTITATIVE ORGANIC ANALYSIS**

1. Estimation of sulphur by Messenger's Method.
2. Estimation of nitrogen by Kjeldahl Method.

**C. ESTIMATION OF FUNCTIONAL GROUP**

1. Estimation of Aniline.
2. Estimation of Amino Group by Acetylation Method.
3. Estimation of Hydroxyl Group by Hydrazone Formation Method.
4. Estimation of Carbonyl Group by Hydrazone Formation Method.

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5. Estimation of Carboxyl Group by Titration Method.
6. Determination of Equivalent Weight of Carboxylic Acid by Silver Salt Method.
7. Estimation of Glucose by Fehling Solution Method.
8. Estimation of Glycine by Titration Method.

#### D. EXTRACTION OF ORGANIC COMPOUNDS FROM NATURAL SOURCES

1. Isolation of Caffeine from leaves.
2. Isolation of Casein from milk.
3. Isolation of lactose from milk.
4. Isolation of nicotine dipicrate from tobacco.
5. Isolation of Cinchonine from cinchona bark.
6. Isolation of Piperine from black paper.
7. Isolation of Lycopene from tomatoes.
8. Isolation of  $\beta$  - Carotene from carrots.
9. Isolation of Limonene from citrus rinds.
10. Isolation of protein and carbohydrates from seeds - colour test.
11. Extraction of Fatty oil from seeds and determination of refractive index of the oil.
12. Isolation of protein and carbohydrate (as reducing sugars) from seed - colour test.

#### BOOK SUGGESTED:

1. Practical Organic Chemistry, by A.I. Vogel/Mann and Saunders/Garg and Saluja.
2. The Systematic Identification of Organic Compounds, R.L. Shriner & D.Y Curtin.

Ashish

and

Swigam

Mishra

Prakash

Sharma

Prasad

Anand

**THIRD SEMESTER**  
**Analytical Chemistry**  
**Laboratory Course - VI**

**Max. Marks 100**

**A. SPECTROPHOTOMETRIC DETERMINATIONS**

1. Manganese / Chromium / Vanadium in steel sample
2. Nickel / Molybdenum / Tungsten / Vanadium / Uranium by extractive spectrophotometric method.
3. Fluoride / Nitrite / Phosphate
4. Iron-phenanthroline complex: Job's Method of continuous variations.
5. Zirconium – Alizarin Red – S complex: Mole – ratio method.
6. Copper - Ethylene diamine complex: Slope-ratio method.

**B. pH METRY**

1. Stepwise proton – ligand and metal – ligand stability constant of complexes by Leving – Rossoti methods.
2. Effect of pH in aqueous colored system.

**C. POLAROGRAPHY**

Composition and stability constant of complexes.

**D. FLAME PHOTOMETRIC DETERMINATIONS**

1. Sodium and Potassium when present together.
2. Lithium/Calcium/Barium/Strontium.
3. Calcium and Magnesium in tap water.

**E. REFRACTOMETRY**

1. Determination the specific and molar refraction of a given liquid by abbe Refractometer.
2. Determine the variation of refractive index.
3. To verify law of refraction of mixture (glycerol + water).

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**F. SEPARATION AND QUANTITATIVE ESTIMATION OF BINARY AND TERNARY MIXTURES BY THE USE OF FOLLOWING SEPARATION TECHNIQUES**

1. Paper chromatography-Cadmium and Zinc, Zinc and Magnesium
2. Thin-layer Chromatography-separation of Nickel, Manganese, Cobalt and Zinc.
3. Ion - exchange.
4. Solvent extraction.
5. Electrophoretic separation.

❖ Some Advanced level sophisticated instrument based ( FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIMETER etc) experiments may be given to the students

1. Estimation of Sulphur by messengers method.
2. Estimation of Nitrogen by Kjeldahl method.
3. Estimation of Halogen by Fusion method.

**BOOK SUGGESTED:**

1. Quantitative Inorganic Analysis, A.I. Vogel.
2. Test book of quantitative chemical analysis, A.I. Vogel.
3. Practical Physical Chemistry, A.M. James and F.E. Prichard, Longman.
4. Findley's Practical Physical Chemistry, B.P. Levi.
5. Experimental Physical Chemistry, R.C. Das and B. Behera, Tata McGraw Hill.

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# Government J. Yoganandam Chhattisgarh College, Raipur

## M.Sc. Chemistry

### EXAMINATION SCHEME

M.Sc. examination will be conducted in four SEMESTERS. Each semester exam shall consist of FOUR THEORY PAPERS AND TWO LAB COURSES.

#### SEMESTER-IV (20 CREDIT)

##### THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH-19	Bioinorganic Chemistry	4	3 Hrs	20	80	100
CH-20	Medicinal Chemistry	4	3 Hrs	20	80	100
CH-21	Environmental Chemistry	4	3 Hrs	20	80	100
CH-22	Analytical Chemistry	4	3 Hrs	20	80	100

##### PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH-23	Lab Course -VII Inorganic Chemistry	2	8Hrs	100
CH-24	Lab Course-VIII Physical Chemistry	2	8Hrs	100

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M.Sc. CHEMISTRY SEMESTER-IV  
PAPER-I  
BIOINORGANIC CHEMISTRY

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Max. Marks 80  
Min. Marks 16

Unit – I

- **Metal Storage Transport and Biomineralization:** Ferritin, transferrin and siderophores.
- **Na+K+Pump:** Role of metal ions in biological processes.
- **Calcium in Biology:** Calcium in living cells, transport and regulation, molecular aspects of intramolecular processes, extra cellular binding proteins.
- **Metals in Medicine:** Metal deficiency and disease, toxic effects of metals for diagnosis and chemotherapy with particular reference to anticancer drugs.

Unit – II

- **Bioenergetics and ATP Cycle:** DNA polymerization, glucose-storage, metal complexes in transmission of energy, chlorophylls, photosystem I and photosystem II cleavage of water molecule system.
- **Electron Transfer in Biology:** Structure and function of metalloproteins in electron transport processes- cytochromes and iron- sulphur proteins, synthetic models.
- **Transport and storage of Dioxygen:** Heme proteins and oxygen uptake, structure and function of haemoglobin, myoglobin, haemocyanins and haemerythrin, model synthesis complexes of iron cobalt and copper.

Unit – III

- **METALLOENZYMES:** Zinc enzymes –carboxypeptidase and carbonic anhydrase. Iron enzymes – catalase, peroxidase and cytochrome P-450. copper enzymes- superoxide dismutase. Molybdenum oxatransferase enzymes –xanthine oxidase.
- **ENZYME MODELS:** Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality. Biomimetic chemistry, Cyclodextrin-based enzyme models, calixarenes, ionophores, synthetic enzymes or synzymes.

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## Unit - IV

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- **ENZYMES:** Nomenclature and classification of induced Enzyme. Fit hypothesis, concept and identification of active site by the use of inhibitors.
- **CO-ENZYME CHEMISTRY:** Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD<sup>+</sup>, NADP<sup>+</sup>, FMN, FAD, lipoic acid, vitamin B12.
- **BIOTECHNOLOGICAL APPLICATIONS OF ENZYMES:** Techniques and methods of immobilization of enzymes, effect of immobilization on enzyme activity, application of immobilization enzymes in medicine and industry. Enzymes and Recombinant DNA Technology.

**LIST OF REFERENCE BOOKS:**

1. Bioinorganic Chemistry, I. Bertini, H.B. Gray, S J. Lippard and J. S .Valentine, University Science Books.
2. Inorganic Biochemistry Vols I and II ed, G.L. Eichhorn, Elsevier.
3. Enzyme Mechanisms, M.I. Page and A. Williams, Royal Society of Chemistry.
4. Enzyme Chemistry: Impact and Applications, Ed. Collin J Suckling, Chapman and Hall.
5. Fundamentals of Enzymology, N.C. Price and L. Stevens, Oxford University Press.
6. Enzyme Structure and Mechanisms, A Fersht, W.H. Freeman.

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**M.Sc. CHEMISTRY SEMESTER-IV**  
**PAPER-II**  
**MEDICINAL CHEMISTRY**

**Max. Marks 80**  
**Min. Marks 16**

**Unit - I**

**Introduction to Drugs and Drugs Design**

Essential and orphan drugs, nomenclature of drugs - IUPAC, routes of drug administration, adverse effects of drugs - type, side effects and minimization. Development of new drugs and factors affecting it, procedures followed in drug design. Theories of drug activity: occupancy theory, rate theory, induced fit theory and macro-molecular perturbation theory. Quantitative structure activity relationship (QS-AR). History and development of QSAR. Concepts of drug receptors. Elementary treatment of drug receptor interactions.

**Unit - II**

**Pharmacokinetics**

Introduction to drug absorption, disposition, elimination using pharmacokinetics, important pharmacokinetics parameters in defining drug disposition and in therapeutics. Mention of uses of pharmacokinetics in drug development process.

**Pharmacodynamics**

Introduction, elementary treatment of enzyme stimulation, enzyme inhibition, sulphonamides, membrane active drugs, drug metabolism, xenobiotics, biotransformation, significance of drug metabolism in Medicinal Chemistry.

**Unit - III**

**Antibiotics**

Constitution and synthesis of Penicillins, chloramphenicol, tetracycline and streptomycin, cephalosporin.

**Antimalarials**

Synthesis and properties of the following Antimalarial .Quinine, 8 - amino quinoline derivatives - Pamaquine, Primaquine, Pentaquine, Isopentaquine, 4-amino quinoline derivatives- Santoquine, camaquine, Acridine derivatives, - Mepacrine, Azacrin, Pyrimidine and Biguanid derivatives - Paludrine, Pyremethamine.

**Unit - IV**

**Local Anti-infective Drugs (IV A):**

Introduction and general mode of action. Synthesis of sulphonamides, furazolidone, nalidixic acid, ciprofloxacin, norfloxacin, dapsone, p-amino salicylic acid, isoniazid, ethionamide, ethambutal, fluconazole, econazole, griseofulvin.

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**Antineoplastic Agents (IV B):**

Introduction, cancer chemotherapy, special problems, role of alkylating agents and antimetabolites in treatment of cancer. Mention of carcinolytic antibiotics and mitotic inhibitors. Synthesis of mechlorethamine, cyclophosphamide, melphalan, uracil, mustards and 6-mercaptopurine. Recent development in cancer chemotherapy. Hormone and natural products.

**LIST OF REFERENCE BOOKS:**

1. Insecticides of Natural Origin, Sukh Derv, Harwood, Academic Publishers.
2. Introduction to Medicinal Chemistry, A Gringuage, Wiley - VCH.
3. Wilson and Gisvold's Text Book of Organic Medicinal and Pharmaceutical Chemistry, Ed Robert F. Dorge.
4. An Introduction to Durg Design, S.S. Pandeya and J.R. Dimmock, New Age International.
5. Burger's Medicinal Chemistry and Drug Discovery, Vol.-1 (Chapter-9 and Ch -14) Ed. M.E. Wolff, John Wiley.
6. Goodman and Gilman's Pharmacological Basis of Therapeutics, McGraw- Hill.
7. The Organic Chemistry of Drug Design and Drug Action, R.B. Silverman, Academic Press.
8. Strategies for Organic Drug Synthesis and Design, D. Lednicer, John Wiley.
9. Natural Products: Chemistry and Biological Significance, J. Mann, R.S. Davidson, J.B. Hobbs.
10. D.V. Banthrope and J.B. Harbrone, Longman, Essex, Organic Chemistry, Vol. 2, I.L. Finar, ELBS.
11. Chemistry, Biological and Pharmacological Properties of Medicinal Plants from the Americans, Ed. Kurt Hostettmann, M.P. Gupta and A. Marston, Harwood Academic Publishers.

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M.Sc. CHEMISTRY SEMESTER-IV  
PAPER-III  
ENVIRONMENTAL CHEMISTRY

Max. Marks 80  
Min. Marks 16

Unit - I

**Environment**

Introduction, Environmental segments, Composition of atmosphere, vertical temperature, heat budget of the earth atmospheric system, vertical stability of atmosphere, Hydrological cycle. Biogeochemical cycles of C, N, P, S and O. Biodistribution of elements.

**Industrial Pollution**

Cement, sugar, distillery, drug, paper and pulp, thermal power plants, nuclear power plants, etallurgy. Polymers, drugs etc. Disposal of wastes and their management.

Unit - II

**Hydrosphere**

Chemical composition of water bodies - lakes, streams, rivers and wet lands etc. Aquatic pollution- Inorganic, organic, pesticide, agricultural, industrial and sewage, detergents, oil spills and oil pollutants. Water quality standards. Purification and treatment of water.

**Soils**

Composition, micro and macro nutrients, Pollution- fertilizers, pesticides, plastics and metals. Waste treatment. Biodegradability.

Unit - III

**Atmosphere**

Major regions of the atmosphere, earth's radiation balance. Chemical composition of atmosphere - Particles, ions and radicals their formation. Air pollution: Chemical and photochemical reactions in atmosphere, photochemical smog formation, oxides of N, C, S, O and their effect, pollution by chlorofluorohydro - carbons. Greenhouse effect, acid rain, air pollution controls and their chemistry.

**Analysis of Air Pollution**

Analytical methods for sampling and measuring air pollutants, continuous monitoring instruments.

Unit - IV

**Analysis of Water Pollution**

Analysis of water pollution: Analytical methods for measuring color, turbidity, total solids, conductivity, acidity, alkalinity, hardness, chloride, sulphate, fluoride, silica, phosphates and different forms of nitrogen, DO, BOD, COD, residual chlorine and chlorine demand. Heavy metal pollution - public health significance of cadmium, chromium, copper, lead, zinc, manganese, mercury and arsenic. General Instrumental techniques for the analysis of heavy metals in aqueous systems.

**Analysis of Soil Pollution**

Moisture, pH, total nitrogen, phosphorus silica, lime, magnesia, manganese, sulphur and alkali salts.

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**LIST OF REFERENCE BOOKS:**

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1. Environmental Chemistry, S. E. Manahan, Lewis Publication
2. Environmental Chemistry, Sharma & Kaur, Krishna Publication.
3. Environmental Chemistry, A.K. De, Wiley Eastern.
4. Environmental Pollution Analysis, S.M. Khopkar, Wiley Eastern.
5. Standard methods of Chemical Analysis, F.J. Welcher vol.3 Van Nostrand Reinhold Co.
6. Elemental Analysis of Airborne Particles, Ed. S. Landsberger and M. Creatchman Gordon & Breach Sci. Publication.
7. Environmental Chemistry, C. Baird, W.H. Freeman.
8. Analytical Chemistry, G.D. Christian, J. Willey.
9. Fundamentals of Analytical. Chemistry. D.A. Skoog, D. M. West and F. J. Holler.

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M.Sc. CHEMISTRY SEMESTER-IV  
PAPER-IV  
ANALYTICAL CHEMISTRY

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Max. Marks 80  
Min. Marks 16

Unit - I

**Introduction of Analytical Chemistry**

Role of analytical chemistry. Classification of analytical methods- classical and instrumental. Basic idea of instrumental. Selecting an analytical method. Volumetric glassware-cleaning and calibration of glassware. Sample preparations - dissolution and decompositions. Gravimetric techniques. Safety in the laboratory.

**Errors and Evaluation**

Definition of terms in mean and median. Precision- standard deviation, relative standard deviation. Accuracy - absolute error, relative error. Types of error in experimental data- determinate (systematic), indeterminate (or random) and gross. Sources of errors and the effects upon the analytical results. Methods for reporting analytical data. Statistical evaluation of data indeterminate errors.

Unit - II

**Analysis of body fluids**

Serum electrolytes, blood glucose, blood urea nitrogen, uric acid, albumin, globulins. Immunoassay: principles of radio immunoassay (RIA) and applications. The blood gas analysis- trace elements in the body.

**Drug analysis**

Narcotics and dangerous drugs. Classification of drugs. Screening by gas and thin layer chromatography and spectroscopic measurements.

Unit - III

**Food Analysis**

Moisture, ash, crude protein, fat, crude fibre, carbohydrates, calcium, potassium, sodium and phosphate. Food adulteration-common adulterants in food, contamination of food stuffs. Microscopic examination of foods for adulterants. Pesticide analysis in food products - general extraction and purification of samples. HPLC and Gas chromatography for organophosphates, Thin layer chromatography for identification of pesticides in food products.

Unit - IV

**Fuel Analysis**

Types of fuels, Solid fuels- Ultimate and proximate analysis - heating values, grading of coal. Liquid fuels -flash point, aniline point, octane number and carbon residue. Gaseous fuels - producer gas and water gas, calorific value.

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LIST OF REFERENCE BOOKS:

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1. Basic Concepts of Analytical Chemistry, S.M.Khopkar, Wiley Eastern.
2. Environmental Solution Analysis, S.M.Khopkar, Wiley Eastern.
3. Standard method of Chemical Analysis, F.J. Welcher vol.41 Van nostrand Reinhold Co.
4. Elemental Analysis of Airborne practices Ed. S. Lands George & M.C. Reichmann, Gordon & Breach Sci. Pub.
5. Environmental Chem., C. Baird, W.H. Freeman.
6. Analytical Chem., G.D. Christian, J. Willey.
7. Fundamentals of Analytical Chemistry, A. Skoog, D. M. West & F. J.Holler.

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**FORTH SEMESTER**  
**Inorganic Chemistry**  
**Laboratory Course - VII**

**Max. Marks 100**

**A. QUANTITATIVE ANALYSIS**

Quantitative separation and determination of three - components system using standard volumetric and gravimetric methods of analysis. The systems can be any one of the following:

- I. Cu, Ag & Zn
- II. Cu, Ni & Zn
- III. Fe, Al & Ca
- IV. Fe, Ca & Mg
- V. Ag, Ni & Zn
- VI. Ba, Ni & Zn

**B. ANALYSIS OF ALLOYS, ORES, AND MINERALS**

- I. Ni alloy
- II. Cu, Ni, Zn alloy
- III. Steel
- IV. Lime stone and dolomite: Silica, Sesqui Oxide ( $R_3O_3$ ), Ca, Mg, L.O.I. etc.
- V. Haematite: Iron, Al, Ca, Mg. Acid insoluble & silica etc.
- VI. Bauxite: Silica, Fe, Al, Be & Ti etc.
- VII. Cement: Silica, Fe, Al, Ca, Mg &  $SO_4^{2-}$  etc.

**C. INORGANIC REACTION MECHANISM:** Kinetics and mechanism of following reactions:

- I. Substitution reactions in octahedral complexes (acid hydrolysis and base hydrolysis)
- II. Redox reaction in octahedral complexes
- III. Isomerisation reaction of octahedral.

**D. PREPARATION:** Preparation of selected Inorganic complexes and other Inorganic compounds and their study by I.R. electronic, Mossbauer and E.S.R. and magnetic susceptibility measurements.

- Sodium amide.
- Synthesis and thermal analysis of group II metal oxalate hydrate.
- Preparation of Tin (IV) iodide, Tin (IV) chloride and Tin (II) iodide.
- Synthesis of metal acetylacetonate : Magnetic moment, IP & NMR.
- Bromination of  $Cr(acac)_3$

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- Cis and Trans  $[\text{Co}(\text{en})_2 \text{Cl}_2]^+$
- Separation of optical isomer of cis- $[\text{Co}(\text{en})_2 \text{Cl}_2] \text{NO}_3, 3\text{H}_2\text{O}$ ,  $[\text{Cr}(\text{H}_2\text{O})_4 \text{Cl}_2], 2\text{H}_2\text{O}$ ,  $[\text{Cr}(\text{en})_3 \text{Cl}_3]$ ,  $[\text{Cr}(\text{acac})_3]$ .
- Reaction of Cr (III) with a multidentate ligand; a kinetic experiment (visible spectra Cr-EDTA complex).
- Preparation of  $[\text{Co}(\text{phenanthroline-5,6-quinone})]$ .
- Preparation and use of Ferrocene.
- Preparation of copper glycine complex - cis and trans - bis [glycinato Copper (II)].
- Preparation of phosphine  $\text{PH}_3\text{P}$  and its transition metal complexes.
- Any other experiment such as conversion of p-xylene to terephthalic acid catalyzed by  $\text{CoBr}_2$  (homogeneous catalysis).

### E. BIO - INORGANIC CHEMISTRY

- I. Extraction of chlorophyll from green leaves of students choice. Separation of chlorophylls and their electronic spectral study.
- II. Complexation study of Cu (II) ion biologically important amino acids.

### BOOK SUGGESTED:

- A.W. Adamson and P.D. Fleischner: Concept of Inorganic Photochemistry.
- V. Balzani and V. Carassiti: Photochemistry of coordination compounds.
- K.K. Rohatgi and Mukherjee: Fundamentals of Photochemistry.
- Quarterly Reviews; 21,213, (1967).
- Coordination Chemistry Reviews 3, 169, (1968).
- Quarterly Reviews; 8,422, (1954).
- G.L. Eichhorn: Inorganic Biochemistry Vols I,II.
- M.W. Hughes: Inorganic Chemistry of Biological Process.
- Purcell and Kotz: Inorganic Chemistry.
- R.C. Mehrotra and A. Singh: Organometallic Chemistry An Introduction.
- J.J. Lagowski: Modern Inorganic Chemistry.

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भौतिकी अध्ययन मण्डल की बैठक सत्र - 2018-19

आज दिनांक 9-7-18 को दोपहर 12:30 बजे डॉ एम.एस. तिवारी, विभागाध्यक्ष भौतिकी शाखा विभाग, शा. जे योगानन्द महाविद्यालय रायपुर की अध्यक्षता में भौतिकी अध्ययन मण्डल की बैठक भौतिकी शाखा विभाग में आयोजित की गयी। बैठक में निम्नलिखित सदस्य एवं विषय विशेषज्ञ सम्मिलित हुए।

(1) डॉ एम.एस. तिवारी प्राध्यापक (विषय विशेषज्ञ) शा. महावि. नगरी सिधवा

(2) डॉ मीरा गुप्ता, प्राध्यापक (विषय विशेषज्ञ) शा. कन्या महावि. ईर्ग

(3) डॉ पी.के. देवागन सहा. प्राध्यापक शा. विज्ञान महावि. रायपुर (सदस्य)

(4) डॉ अंजलि भटनागर सहा. प्राध्यापक, शा. जे. यो. महावि. रायपुर

(5) अश्विनेश जाधव (सदस्य) सहा. प्राध्यापक, शा. जे. यो. महावि. रायपुर

प्रस्ताव :- सत्र 2018-19 के लिये B.Sc. तथा M.Sc. (Phys) हेतु भौतिकी शाखा विषय के पाठ्यक्रम का निर्धारण करना  
निर्णय :-

पं. वनिशंकर विश्व विद्यालय द्वारा सत्र 2018-19 के लिए B.Sc. हेतु निर्धारित पाठ्यक्रम को यथावत लागू किया जाय तथा प्रस्तावित M.Sc. के पाठ्यक्रम

की लागू किया जावे।

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[Redacted] प्रतिक्रिया केंद्र  
रजिस्ट्रार [Redacted] ए. ए.]

स्वशासी निकाय

शासकीय जे. योगानन्दम् छत्तीसगढ़ महाविद्यालय रायपुर (छ.ग.)

विभाग का नाम :- भौतिकशास्त्र

सत्र : 2018-19

विगत वर्ष के पाठ्यक्रम में किया गया परिवर्तन

विषय का नाम :- भौतिकशास्त्र

प्रश्न पत्र क्रमांक :- M. SC III<sup>rd</sup> & IV<sup>th</sup> sem

प्रश्न पत्र का नाम :- समीक्षा पत्र

पूर्णांक :- 100

उत्तीर्णांक :- 36

परिवर्तन से संबंधित विवरण :

III<sup>rd</sup> sem.

New Course Introduce

IV<sup>th</sup> semester

Paper-I Condensed Matter physics-I

Paper-I Condensed Matter physics-II

Paper-II Nuclear and Particle physics

Paper-II - Electrodynamics & Plasma physics

Paper-III Laser physics and spectroscopy

Paper-III Numerical Analysis and Computer programming

Paper-IV physics and Nano Materials-I

Paper-IV physics of Nano Material-II

Lab course A - General & Material Science

Lab course A - Numerical Analysis and computer programming

Lab course B - physics of Nano Materials

project work

प्राचार्य

अध्ययन मण्डल के सदस्यों के हस्ताक्षर

  
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**Semester III:**

Name of the paper	Marks					Credit
	Theory/Practical		Internal		Total	
	Max.	Min.	Max.	Min.		
CONDENSED MATTER PHYSICS-I:	80	16	20	04	100	4
NUCLEAR AND PARTICLE PHYSICS:	80	16	20	04	100	4
LASER PHYSICS AND SPECTROSCOPY:	80	16	20	04	100	4
PHYSICS OF NANO MATERIALS -I:	80	16	20	04	100	4
Lab work A: General & Materials Science	100	36			100	2
Lab work B : Physics of nano materials	100	36			100	2
<b>Total Marks / credits</b>					<b>600</b>	<b>20</b>

Total marks for semester III = 600 & credit =20

**Semester IV:**

Name of the paper	Marks					Credit
	Theory/Practical		Internal		Total	
	Max.	Min.	Max.	Min.		
CONDENSED MATTER PHYSICS-II:	80	16	20	04	100	4
ELECTRODYNAMICS AND PLASMA PHYSICS:	80	16	20	04	100	4
NUMERICAL ANALYSIS AND COMPUTER PROGRAMMING:	80	16	20	04	100	4
PHYSICS OF NANO MATERIALS -II:	80	16	20	04	100	4
Lab work A: Numerical Analysis & Computer Programming	100	36			100	2
Project work	100	36			100	2
<b>Total Marks / credits</b>					<b>600</b>	<b>20</b>

19/11/18
   
 21/11/18
   
 22/11/18
   
 23/11/18
   
 24/11/18

Total marks for semester IV = 600 & credit =20

Marks-distribution for each laboratory course in each semester:

Experiment	60 Marks
Sessional	20 Marks
Viva	20 Marks

Marks-distribution for project work:

Dissertation	30 Marks
Presentation	50 Marks
Comprehensive viva-voce	10 Marks
Internal assessment	10 Marks

### Examination scheme:-

The question paper for each semester examination will consist of seven questions of equal marks in every theory paper.

The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The student is expected to provide reasoning / solution / working for the answer.

The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

In semester IV, Project work in Condensed matter physics/ Physics of Nano-materials will lead to specialization in the respective area. It will be primarily based on research oriented topics. On completion of the project, student will submit project report in the form of dissertation which will be examined by an external examiner. The examination of project work shall consist of (a) Presentation and (b) comprehensive viva-voce.

The books indicated as text-book(s) are suggestive of the level of coverage. However, any other book may be followed.



## Semester-III

### 1. CONDENSED MATTER PHYSICS-I:

**Note:-** The question paper will consist of seven questions of equal marks. The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

#### UNIT-I:

Crystalline solids: Unit cells, symmetry elements, 2-D and 3-D Bravais lattices, Crystal structures-sc; bcc; fcc; hcp, Miller Indices, Inter planar spacing, Atomic packing in 2-D and 3-D, Closed packed structures, Elastic constants and elastic waves in cubic crystals.

#### UNIT-II:

Interaction of X-ray with matter, Absorption of x-ray, Diffraction of X-rays by lattice, the Laue equation, Bragg's law, Ewald construction, Reciprocal lattice and its applications to diffraction techniques, Brillouin zones. The Laue powder and rotating crystal methods, crystal structure factor.

#### UNIT-III:

Electrons in a periodic lattice: Bloch theorem, band theory, classification of solids, effective mass. Tight-binding approximation, cellular, APW, OPW and pseudo-potential methods. Fermisurface, De Hass vanalfen effect, cyclotron resonance. Superconductivity: critical temperature, persistent current, Meissner effect, energy gap, coherence length, London equation.

#### UNIT-IV:

Classical Langevin's theory of diamagnetism, paramagnetism, and ferromagnetism. Weiss theory of paramagnetism. Antiferromagnetism, neel temperature. Point

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defects, line defects and planer (stacking) faults. Colour centres, the role of dislocations in crystal growth. The observation of imperfect ions in crystals, X-ray and electron microscopic techniques.

### TEXT AND REFERENCE BOOKS:

1. Solid State Physics; Ashcroft & Mermin.
2. Introduction to Solid State Physics; C. Kittel.
3. Principles of Condensed Matter Physics; Chaikin and Lubensky.
4. Solid State Physics; M A Wahab.
5. Introduction to solids; Azaroff.
6. Elementary Solid State physics; Omar.
7. Solid State Physics ; N.W. Ashcroft and N.D. Mermin, Brooks/Cole.
8. Principles of the Theory of Solids; J.M. Ziman, Cambridge University Press.
9. Solid State Physics; A.J. Dekker, Macmillan.
10. Solid State Physics; G. Burns, Academic Press.
11. Condensed Matter Physics; M.P. Marder, Wiley.

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*for Omar*

*Amir*

*King*

## 2. NUCLEAR AND PARTICLE PHYSICS:

**Note:-** The question paper will consist of seven questions of equal marks. The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

### UNIT I

Static properties of Nuclei: Nuclear size determination from electron scattering, nuclear charge distribution. Angular momentum, spin and moments of nuclei. Binding energy, semi-empirical mass formula, Liquid drop model, fission and fusion Two Nucleon Systems & Nuclear Forces: Dipole and quadrupole moments of the deuteron, central and tensor forces, Evidence for saturation property, Neutron-proton scattering, proton-proton scattering, S-wave effective range theory. charge independence and charge symmetry, exchange character, spin dependence. Isospin formalism. General form of the nucleon-nucleon force. Yukawa interaction.

### UNIT II

Nuclear Decays: Alpha decay: Geiger-Nuttall law, Electromagnetic decays: selection rules, Fermi theory of beta decay. Kurie plot. Fermi and Gamow-Teller transitions. Parity violation in beta-decay. Nuclear Models: Liquid drop model, Collective model of Bohr and Mottelson.

Rotational spectra, nuclear shapes. Experimental evidence for shell effects, shell model, spin orbit coupling, Magic numbers, angular momentum and parities of nuclear ground states, Qualitative discussion and estimates of transition rates, Magnetic moments and Schmidt lines.

### UNIT III

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Introduction to Nuclear Reactions. Direct and compound nuclear reaction mechanism-cross-sections in terms of partial wave amplitudes -compound nucleus -scattering matrix-Reciprocity theorem. Breit-Wigner one Level formula-Resonance scattering.

#### UNIT IV

Elementary Particles (quarks, baryons, mesons, leptons). Classification: spin and parity assignments; isospin, strangeness. Elementary ideas of SU(2) & SU(3). Gell-Mann-Nishijima scheme. C, P and T invariance, application of symmetry arguments to particle reaction. Properties of quarks and their classification. Introduction to the standard model, Electroweak interaction, W & Z Bosons. Parity non-conservation in weak interactions, Relativistic kinematics.

#### TEXT AND REFERENCE BOOKS:

1. Nuclear Physics; S.N. Ghoshal, S. Chand & Company Ltd, 2004
2. Introducing Nuclear Physics; K. S. Krane (Wiley India., 2008) .
3. Nuclear Physics Theory & Experiments; R.R. Roy & B.P. Nigam (New Age international, 2005)
4. Nuclear & Particle Physics-An Introduction; B. Martin (Wiley, 2006)
5. Introduction to Elementary Particles; D. J. Griffiths (Academic Press 2nd Ed. 2008)
6. Concept of Nuclear Physics; B. L. Cohen (McGraw-Hill, 2003)
7. Nuclear structure; A. Bohr and B.R. Mottelson, vol. 1 (1969) and vol. 2, Benjamin, Reading, A, 1975.
8. Introductory Nuclear Physics; Kenneth S. Kian, Wiley, New York, 1988.
9. Atomic and Nuclear Physics; Ghoshal, vol. 2.
10. Introduction to high energy physics; P.H. Perking, Addison-Wesley, London, 1982.
11. Nuclear Physics; Shriokov Yudin, vol. 1 & 2, Mir Publishers, Moscow, 1982.
12. Introduction to Nuclear Physics; H.A. Enov, Addison-Wesley, 1973.
13. Nucleon-Nucleon interaction; G.E. Brown and A.D. Jackson, North-holland Amsterdam, 1976.
14. Nuclear interaction; S.D. Benedetti, John Willey and sons, New York, 1964.
15. Introductory nuclear physics; Y.R. Waghmare, Oxford, IBH, Bombay, - 1981.
16. Elementary particles; J.M. Longo, McGraw Hill, New York, 1971.

### 3. LASER PHYSICS AND SPECTROSCOPY:

**Note:-** The question paper will consist of seven questions of equal marks. The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

#### UNIT-I:

Basic Principles of Laser, Two level, Three and Four level laser system, Rate equations for three and four level system, threshold pump power, Relative merits and de-merits of three and four level system, Gas and dye lasers, Application of Laser in Material Processing.

#### UNIT-II :

Optical resonators, Stability of resonators, Characteristics of Gaussian beam, Transverse and longitudinal modes, mode selection, losses in a resonator, mirror mounts, optical coating etc., Q switching and Mode locking. Non-linear polarization of lasers and some applications: Second harmonic generation using non-linear optical methods.

#### UNIT-III :

Concepts of spectroscopy, Process of Absorption, Emission and Scattering, Dispersing devices and detectors; Dispersion and resolution of a prism and a grating spectrometer, Single and double monochromators, Photomultiplier tube, Charge coupled detectors (CCD).

#### UNIT-IV :

UV-visible molecular absorption spectroscopy, Molecular luminescence spectroscopy (Fluorescence, phosphorescence, chemiluminescence), Infrared Spectroscopy: Instrumentation and typical applications of infrared spectroscopy (qualitative and

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quantitative). Raman Spectroscopy: Instrumentation, Applications of Raman spectroscopy.

### TEXT AND REFERENCE BOOKS:

1. Laser Theory and Applications; K. Thyagarajan and A.K. Ghatak
2. Principles of Lasers; O. Svelto.
3. Laser Spectroscopy and Instrumentation; W. Demtroder.
4. Laser Material Processing; William M. Steen
5. Modern Spectroscopy; J. M. Hollas
6. Fundamentals of Molecular Spectroscopy; C. N. Banwell and E.M. Mc Cash.
7. Advances in Laser spectroscopy; Edited by F.T.Arecchi
8. Laser Applications; Monte Ross.
9. Lasers and nonlinear optics; Laud, B.B. (New Age Int.Pub.1996).
10. Optical electronics;, Ghatak, A.K.and Thyagarajan, K (Cambridge Univ. Press 1999). Lasers ; Seigman, A.E., ( Oxford Univ. Press 1986) .
11. Laser Physics; Maitland, A. and Dunn, M.H.: (N.H.Amsterdam, 1969).
12. The laser Guide book; Hecht, J. (McGraw Hill, NY, 1986).
13. Laser Spectroscopy; Demtroder, W. (Springe series in chemical physics vol.5, Springe verlag, Berlin, 1981).

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#### 4. PHYSICS OF NANO MATERIALS –I:

**Note:-** The question paper will consist of seven questions of equal marks. The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

##### Unit I:

Nano Materials

Properties of Nano-Particles: Metal nano-clusters, theoretical modeling of nanoparticles, geometric and electronic structure, magnetic clusters, Semiconductor nanoparticles, optical properties, rare gas and molecular clusters, Bulk nano-structured materials: Solid disordered nanostructures, methods of synthesis, properties, nano-cluster composite glasses, porous silicon, nano structured crystals.

##### UNIT II:

Carbon Nano Tubes (CNTs)

Nature of carbon bonds, different allotropies of carbon, structure and properties of C60, graphene, carbon nanotubes and its types, laser vaporization techniques, arc discharge method and chemical deposition technique, purification techniques, Properties of Carbon Nanotubes and Graphene: Optical, electrical, electronic, mechanical, thermal, optical, and vibrational properties.

##### UNIT III:

Synthesis of Nano- Materials

Top-down & Bottom-up approaches: Formation of nanostructures by mechanical milling (ball milling) and mechanical attrition, Chemical Vapor Deposition (CVD), Physical Vapour Deposition (PVD), thermal and e beam evaporation, Pulsed Laser Ablation (PLD).

Chemical Routes for synthesis of Nanomaterials: Chemical precipitation and co-precipitation, chemical bath deposition (CBD), Sol-gel synthesis, Microemulsions

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or reverse micelles, Solvothermal synthesis, Thermolysis routes and spray pyrolysis.

### UNIT IV:

Characterization of Nano-materials

X-ray Diffraction (XRD), powder and single crystal Diffraction, X-ray fluorescence (XRF), X ray photoelectron spectroscopy (XPS), Energy Dispersive X-ray analysis (EDAX), Extended X ray absorption and fluorescence spectroscopy (EXAFS), Dispersive high pressure XRD and Diamond anvil cells (DAC).

Nuclear Magnetic Resonance (NMR) and Raman spectroscopy: description and analysis. Surface analysis methods: Secondary ion mass spectroscopy (SIMS), Auger Electron Spectroscopy, ESCA, Deep Level Transient Spectroscopy (DLTS), Thermo Gravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), Differential Thermal Analysis.

Scanning Electron Microscopy (SEM), Transmission electron microscopy (TEM), High resolution TEM Field emission SEM, Electron Energy Loss Spectroscopy (EELS), Electron Probe Micro Analyzer (EPMA).

Spectrophotometry: UV-Vis spectrophotometers, IR spectrophotometers, Fourier Transform Infrared Radiation (FTIR), Photoluminescence (PL), electroluminescence and thermo luminescence spectroscopy,

### TEXT AND REFERENCE BOOKS:

1. Nano materials, Synthesis properties, characterization and application; A.S Edelstein and R.C Cammaratra
2. Introduction to Nanotechnology; Charles P. Poole Jr and Franks J. Qwens
3. Nanotechnology; Kohlr, Michael.
4. Nanoelectronics and Nanosystems ; Karl Goser, Peter Glosekotter, Jan Dienstuhl., Springer, 2004.
5. Handbook of Analytical instruments; R.S. Khandpur.
6. X-ray diffraction procedures; H. P. Klung and L.E.Alexander.
7. The Powder Method IV; Azaroff and M. J. Buerger.
8. Elements of X-ray diffraction; B. D.Cullity.
9. Differential Thermal Analysis; R.C.Mackenzie.
10. Thermal Methods of Analysis; W.W.Wendlandt.
11. Synthesis, Functionalization and Surface treatment of Nanoparticles; Marie Isbella and Buraton.
12. Encyclopedia of Nanotechnology; H.S. Nalwa.
13. Nanomaterial Systems Properties and Application; A.S.Eldestein and R.C.Cammarata.
14. Handbook of Nanotechnology; Bhushan (Ed), Springer Verlag, New York (2004).

15. Nanostructures and Nanomaterials- Synthesis properties and Applications; Guozhong Cao (Empirical College Press World Scientific Pub., 2004).
16. Nano composite Science and Technology; Ajayan, Schadler and Braun.
17. Fullerene & Carbon nanotubes; Dressel Shaus.
18. Carbon Nanotubes; Elizer.
19. Physical properties of CNT; Saito.
20. Carbon nanotechnology; Liming Dai.
21. Nanotubes and nanowires; CNR Rao and Govindaraj, RCS Publishing.
22. Piezoelectric Sensors-Force, Strain, Pressure, Acceleration and Acoustic Emission, Sensors, Materials and Amplifiers; G. Gautschi.
23. Block Copolymers in Nanoscience; Massimo Lazzari.
24. Supramolecular Chemistry; Jonathan W. Steed, Jerry L. Atwood.
25. Nanotechnology- Importance and Application; M.H. Fulekar, IK International, 2010.
26. Nanotechnology in Biology and Medicine-Methods; Devices and Application, Tuan Vo-Dinh, CRC press, 2007.
27. Nanosystem characterization tools in the life sciences; Challa Kumar, Wiley-VCH, 2006.
28. Nanolithography; M.Gentili et al,(edits) Springer.
29. Environanotechnology; Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin Wang, Rachid Sliman, Ian Wright. Elsevier, 2010.
30. Nanotechnologies-Hazards and Resource efficiency; M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
31. Nanotechnology- Health and Environmental risk; Jo Anne Shatkin. CRC press, 2008.
32. An Introduction to Quantum Computing; Phillip Kaye, Raymond Laflamme, Michele Mosca.
33. The Physics of Quantum Information, Quantum Cryptography, Quantum Teleportation, Quantum Computation ; Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger
34. Problems and Solutions in Quantum Computing and Quantum Information; Yorick Hardy Willi-Hans Steeb.

## LABORATORY COURSE

### Lab III-A: General & Materials Science (Any ten)

1. To determine activation energy of ionic/superionic solid by Temperature depended conductivity measurement.
2. To study Electron Spin(ESR) Resonance in DPPH (Diphenyl Pricyl Hydrazy) sample.
3. To study I-V characteristics of photovoltaic solar cell and find the efficiency.



4. To study the decay of photoconductivity of given sample and find out trap depth.
5. Study of decay of photoluminescence of a given sample.
6. Measurement of electrical conductivity using Impedance Spectroscopy technique.
7. To determine drift velocities of  $\text{Ag}^+$  ion in  $\text{AgI}$  from temperature dependence of ionic transference number study.
8. Electrical conductivity of Ball milled/Mechano-chemical synthesized materials.
9. Determination of strength of a given radioactive source.
10. Study of complete spectra of radioactive sources, and study of photo peak efficiency of  $\text{NaI(Tl)}$  crystal for different energy gamma rays.
11. Structural analysis of powder sample by XRD and particle size determination using Scherrer's formula.
12. FTIR studies of solid samples.
13. Mechanoluminescence of sucrose crystals.
14. Thermoluminescence of irradiated samples.
15. Study of Op-Amp.-IC-741 is inverting/ Non inverting amplifier and draw frequency response curve.
16. Construction of Schmitt triggers using IC-741 and study of its characteristics.
17. Study of Astable and monostable Multi Vibrator using IC 555.
18. Digital electronics experiments on bread board using IC-7400.

### Lab III (B) : Physics of nano materials (Any ten).

1. Synthesis of II-IV semiconductor nanoparticles by wet chemical method.
2. Synthesis of nanoparticles ( $\text{ZrO}_2$ ) by Combustion method.
3. Synthesis of nanoparticles by Sol-gel method.
4. Synthesis of nanoparticles by Ball milling method.
5. Synthesis of Quantum cells structures using vacuum coating unit.
6. Synthesis of nanoparticles using Solid state reaction method.
7. Measurement of band gap energy and size of the nano particle of II-IV semiconductor using absorption spectrophotometer.
8. To make the peak analysis of IR transmission spectra of nanoparticle using FTIR spectrometer.
9. Study of effect of capping agent on the size of the nanoparticle during synthesis.
10. To determine the average particle size of nano materials by XRD using Scherrer's formula.
11. To determine the Hall coefficient and carrier type for a semiconducting nanoparticles.
12. To determine the Band gap of a given semiconductor using Four probe method from room temperature to  $100^\circ\text{C}$ .

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## Semester-IV

### 1. CONDENSED MATTER PHYSICS-II:

**Note:-** The question paper will consist of seven questions of equal marks. The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

#### UNIT-I

Interacting electron gas: Hartree and Hartree-Fock approximations, correlation energy, plasma oscillations, dielectric function of a electron gas in random phase approximation. Strongly-interacting fermi system.

Elementary introduction to Landau's quasi-particle theory of a fermi liquid. Strongly

correlated electron gas. Elementary ideas regarding surface states, metallic surface and surface reconstruction.

#### UNIT-II

Point Defects: Shallow impurity states in semiconductors. Localized lattice vibrational states in solids. Vacancies, interstitials and colour centres in ionic systems. Disorder in condensed matter, substitutional, positional and topographical disorder, short and long range order. Atomic correlation function and structure descriptions of glasses and liquids. Anderson model for random systems and electron localization, mobility edge, qualitative application of the idea to amorphous semiconductors and hopping conduction.

#### UNIT-III

Mechanism of plastic deformation in solids, stress and strain fields of screw and edge dislocations, Elastic energy of dislocations. Forces between dislocations, stress needed to operate Frank-read source, dislocations in fcc, hcp and lattices. Partial dislocations and stacking faults in close-packed structures.

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**UNIT-IV**

Study of surface topography by multiple -beam interferometry, Conditions for accurate determination of step height and film thicknesses (Fizeau fringes). Electrical conductivity of thin films, Difference of behaviour of thin films from bulk , Boltzmann transport equation for a thin film ( for diffused scattering ) ,expression for electrical conductivity for thin film.

**TEXT AND REFERENCE BOOKS:**

1. Introduction to solid state theory; Madelung .
2. Quantum theory of solid state; Callaway
3. Theoretical solid state physics; Huang.
4. Quantum theory of solids; Kittel
5. X-ray crystallography; Azaroff
6. Elementary Dislocation theory; Weertman & weertman
7. Crystallography for solid state physics; Verma & Srivastava.
8. Solid state physics; Kittel
9. The Powder Method ; Azaroff & Buerger.
10. Crystal structure Analysis; Buerger.
11. Transmission Electron microscopy; Thomas.
12. Principles of the Theory of Solids; J. Ziman (Cambridge University Press) 1972.
13. Solid State Physics; H. Ibach and H. Luth (Springer, Berlin), 3rd. ed. 2002.
14. A Quantum Approach to Solids; P.L. Taylor (Prentice-Hall, Englewood Cliffs), 1970.
15. Intermediate Quantum Theory of Solids; A.O.E. Animalu (East-West Press, New Delhi),1991.
16. Solid State Physics; Ashcroft and Mermin, (Reinhert & Winston, Berlin) 1976.

## 2. ELECTRODYNAMICS AND PLASMA PHYSICS:

**Note:-** The question paper will consist of seven questions of equal marks. The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

### Unit-I:

Review of Four-vector and Lorentz transformation in four dimensional space, electromagnetic field tensor in four dimensions and Maxwell's equations, Dual field tensor, Wave equation for vector and scalar potential and solution retarded potential, Lienard-Wienchert Potential, Electric and magnetic fields due to a uniformly moving charge and accelerated charge, linear and circular acceleration and angular distribut- ion of power radiated, Bremsstrahlung,

### Unit-II:

Motion of charged particle in electromagnetic field, Uniform E and B fields, Non-uniform fields, Diffusion across magnetic fields, Time varying E and B fields, Adiabatic invariants, First , second and third adiabatic invariant .

### Unit-III:

Elementary concepts of plasma, derivation of moment equation from Boltzman equat -ion, plasma oscillations, Debye shielding, plasma parameters,

### Unit-IV:

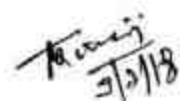
Hydro dynamical description of plasma, Fundamental equations, hydrodynamic waves, magnetosonic Alfvén waves, Wave phenomena in magneto plasma, polarizat- ion, phase velocity, group velocity, cut-offs, resonance for electromagnetic wave propagating parallel and perpendicular to the magnetic field, Appleton-Hartee formula and propagation through ionosphere and magnetosphere,

### TEXT AND REFERENCE BOOKS:

1. Classical electricity and Magnetism; Penofsky and Philips.

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2. Plasma Physics; Bittencourt .
3. Plasma Physics and Controlled Fusion; F.F. Chen.
4. Classical Electrodynamics; Jackson.
5. Plasma Physics; S.N. Sen.
6. Radiative Processes in Astrophysics; Rybicki & Lightman.
7. Classical Electrodynamics; S.P. Puri (Narosa Publishing House) 2011.
8. Introduction to Electrodynamics; D.J. Griffiths (Prentice Hall India, New Delhi) 4<sup>th</sup> ed., 2012.
9. Introduction to Electrodynamics; A.Z. Capri and P.V. Panat (Narosa Publishing House) 2010.
10. Principles of Plasma Physics; N.A. Krall and Trivelpiece (San Francisco Press 1986).
11. The Framework of Plasma Physics; R.D. Hazeltine and F.L. Waelbroeck (Perseus Books, 1998).



### 3. NUMERICAL ANALYSIS AND COMPUTER PROGRAMMING:

**Note:-** The question paper will consist of seven questions of equal marks. The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

#### Unit-I:

Basic computer programming, Flow chart, FORTRAN programming preliminaries, FORTRAN constants & variables

#### Unit-II:

Arithmetic expression, I/O statements, control statements (Do, if, while loop), format specification, logical expression, Function/subroutines, File processing, Examples

#### Unit-III:

Methods for determination of Zeroes of linear and nonlinear algebraic equations and transcendental equations ,convergence of solutions.  
Solution of simultaneous linear equations, Gaussian elimination, pivoting, iterative Method, Matrix inversion.

#### Unit-IV:


Eigen values and eigenvectors of matrices ,power and Jacobi method Finite Differences , interpolation with equally spaced and unevenly spaced point , Curve fitting Polynomial least squares, Numerical solution of ordinary differential equation, Euler & Runge-Kutta method, Numerical integration, Trapezoidal rule, Simpson's method.

#### TEXT AND REFERENCE BOOKS:

1. Introductory methods of Numerical Analysis: Sastry.

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2. Numerical Analysis and Fortran Programming; Rajaraman
3. Numerical Mathematical Analysis; J.B. Scarborough (Oxford & IBH Book Co.) 6th ed., 1979.
4. A first course in Computational Physics; P.L. DeVries (Wiley) 2nd edition, 2011.
5. Computer Applications in Physics; S. Chandra (Narosa) 2nd edition, 2005.
6. Computational Physics; R.C. Verma, P.K. Ahluwalia and K.C. Sharma (New Age) 2000.
7. Object Oriented Programming with C++; Balagurusamy (Tata McGrawHill) 4th edition 2008.
8. Numerical Recipes- The Art of Scientific Computing; W.H. Press, B.P. Flannery, S.A. Teukolsky and W.T. Vetterling, Cambridge University Press.
9. Numerical Methods for Scientists and Engineers; H.M. Antia, Hindustan Book Agency. Computer Simulation Methods in Theoretical Physics; D.W. Heermann, Springer.
10. An Introduction to Computer Simulation Methods; H. Gould and J. Tobochnik, Addison- Wesley.
11. Computational Physics; J.M. Thijssen, Cambridge University Press.


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#### 4. PHYSICS OF NANO MATERIALS -II :

**Note:-** The question paper will consist of seven questions of equal marks. The first question will be compulsory and will consist of 6-8 short answer type questions / problems covering entire syllabus of the concerned paper, out of which student will attempt any five questions. The candidates will attempt five Questions in all, including the compulsory question. The question paper is expected to contain problems to the extent of 30% of total marks.

##### UNIT I:

###### Application of Nano-materials

Quantum wells, wires and dots. Organic Semiconductors, Organic Light Emitting Diodes (OLEDs), self assembly of complex organic molecules, molecular switches, thermochromic switches, Motor molecules and bio-mimetic components, charge transfer complexes, conducting polymers, light emitting polymers, polymer-polymer heterostructures, plastic FETs, photodiodes & solar cells, Nano Robotics: Nano robots and NEMS, Sensors and actuators, Artificial molecular machines, Biomotors, Other nano machines, Propulsion, Control, Communication, Programming and coordination.

##### UNIT II:

###### Application of CNT

Applications of Carbon NanoTubes (CNTs) in field emission, fuel cells, CNT FETs, Light Emitting Displays (LEDs) and Flat Panel Displays (FPD), hydrogen storage, solar panels. Application of functional nanomaterials: clean energy (Hydrogen Production from Biomass, Catalytic coal hydrogasification), environmental technologies ( clean water and air), health care ( tissue and bone repairs, bio medical sensors)

##### Unit III:

###### Next Generation Applications for Polymeric Nanofibres

Background, Biomedical Applications, Medical Prostheses, Tissue Engineering Scaffolds, Drug Delivery, Wound Dressing, Cosmetics. Filtration applications, Filter media, Protective Clothing, Material Reinforcement, Electrical Conductors, Optical applications, Sensor devices, Conclusion.

Reference: Nanotechnology: Global Strategies, Industry Trends and Applications (Editor: Jurgen Schulte)



**UNIT IV:****Nano-Lithography**

Photolithography Principles; Phase Shifting Optical Lithography; Electron Beam Lithography (EBL); Neutral Atomic Beam Lithography; Ion-Beam Lithography (IBL); X-ray Lithography (XRL); Proximal Probe Lithography, Proximal Probes, STM based Electron-Beam Lithography, Soft Lithography, Nano lithographic applications and current research.

**TEXT AND REFERENCE BOOKS:**

1. Nanostructures & Nanomaterials- Synthesis, Properties & Applications; Guozhang Cao.
2. Introduction to Nanotechnology; Charles P. Poole Jr and Franks J. Qwens.
3. Handbook of Analytical instruments; R.S. Khandpur.
4. Nano materials:-Synthesis,properties,characterization and application; A.S Edelstein and R.C Cammaratra.
5. Nanoelectronics and Nanosystems ; Karl Goser, Peter Glosekotter, Jan Dienstuhl. Springer, 2004.
6. Nanomaterial Systems Properties and Application; A.S.Eldestein and R.C.Cammarata.
7. Handbook of Nanotechnology; Bhushan (Ed), Springer Verlag, New York (2004).
8. Nanocomposite Science and Technology; Ajayan, Schadler and Braun.
9. Piezoelectric Sensors-Force, Strain, Pressure, Acceleration and Acoustic Emission Sensors, Materials and Amplifiers; G. Gautschi.
10. Block Copolymers in Nanoscience; Massimo Lazzari
11. Supramolecular Chemistry; Jonathan W. Steed, Jerry L. Atwood.
12. Nanotechnology- Importance and Application; M.H. Fulekar, IK International, 2010.
13. Nanotechnology in Biology and Medicine- Methods, Devices and Application; Tuan Vo-Dinh, CRC press, 2007.
14. Nanosystem characterization tools in the life sciences; Challa Kumar, Wiley-VCH, 2006.
15. Nanolithography; M.Gentili et al.(edits),Springer.
16. Environanotechnology ; Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin Wang, Rachid Sliman, Ian Wright, Elsevier, 2010.
17. Nanotechnologies- Hazards and Resource efficiency; M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
18. Nanotechnology- Health and Environmental risk; Jo Anne Shatkin. CRC press, 2008.
19. An Introduction to Quantum Computing; Phillip Kaye, Raymond Laflamme, Michele Mosca.

20. The Physics of Quantum Information, Quantum Cryptography, Quantum teleportation, Quantum Computation ; Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger.


#### Lab IV-A: Numerical Analysis & Computer Programming (Any ten)

1. To solve simultaneous Linear equation by Gauss Elimination method.
2. To calculate the root of a transcendental equation by Newton – Raphsons method.
3. Solving the system of linear simultaneous equation by Gauss Serdel method.
4. Numerical Integration by Simpson's 1/3 Rule.
5. Solving simultaneous Linear equation by Gauss-Jordon method.
6. Solution of Differential equation by Euler's Method.
7. To invert a given matrix by Gauss-Jordon Method.
8. Solution of Differential equation by Runga Kutte Method.
9. To fit the given data in a straight line by linear regression Method.
  - a) WAP to find the Largest of n number of series.
  - b) To calculate the standard deviation of a given set of data.
10. To write a program to compute the complex roots of a given polynomial of Nth degree by Graffe's Method.
11. To write a program to compute the Eigen values of a given matrix.
12. To integrate a given function by: (a) Trapezoidal method or by (b) Gauss Quadrature.
13. To find solutions of Ist order, ordinary differential equation by Taylor method

#### PROJECT

Project on physics of nano materials / condensed matter physics.

←—————→



42

Rishi  
5/3/19

प्राज दिनांक 20/12/2018 को अपराह्न 3.00 बजे स्वधासी  
 एकादमिक परिषद की बैठक प्राचार्य कक्ष में डा सीडप्लॉ  
 विंगन की अध्यक्षता में आयोजित की  
 गई। बैठक में निम्न सम्मानित सदस्य गण उपस्थित रहे।

श्री विरेन्द्र तिवारी

*[Signature]*  
 20/12/18  
 20.12.18

श्री के.के. भूषण

श्री आत्मबोध अग्रवाल

*[Signature]*  
 18/12/2018

श्री धीरेन्द्र नशिन

डा० एम० के० देव

डा० ए.के. प्रधान

डा० प्रीति के० सुरेश

डा० पी०के० अग्निहोत्री

*[Signature]*

डा० डी०के० पाण्डेय

*[Signature]*

डा० सुमद्रा राठौर

डा० टी० जै० नाथर

*[Signature]*

डा० पुष्पा केशिड (Manju Verma - *[Signature]*)

डा० विजय अग्रवाल -

डा० डी०के० वर्मा

डा० स्मृति चक्रवर्ती *[Signature]*

डा० मधु श्री दुन *[Signature]*

डा० एम० एम० तिवारी

*[Signature]*

डा० अनिल रामटेक

*[Signature]*

डा० ए० के० परसाई *[Signature]*

डा० उ०के० विदाल

*[Signature]*

डा० कान्ति तिवारी

*[Signature]*  
 20/12/18

डा० टी० ए० वर्मा

*[Signature]*  
 20/12/2018

डा० मंजुला उपाध्याय

*[Signature]*  
 20/12/18

डा० एस० एस० गौर

*[Signature]*  
 20.12.18

डा० अशा चौधरी

*[Signature]*  
 20.12.18

डा० शिल्पी कौस

डा० नंदा रेमा

*[Signature]*

डा० प्रीति मिश्रा for  
 (डा० ए०के०. राठौर)

*[Signature]*


बैंक की कार्यवाही निम्नानुसार रही।


1. सर्वप्रथम प्राचार्य महोदय द्वारा आमन्त्रित सदस्यों को पुष्पगुह्य से स्वागत किया गया तत्पश्चात् उत्सव की अनुमति से एजेण्डा के प्रथम विन्दु पर चर्चा की गयी। जिसमें पूर्व बैंक में लिए गये निर्णय का वाचन किया गया। वाचन के दौरान प्रो० एम० एम० तिवारी द्वारा भौतिकशास्त्र के विभिन्न प्रश्नपत्रों में गुणवत्ता पर ध्यान देने की बात कही तत्पश्चात् सर्वसम्मति से बैंक के बैंक में लिए गये निर्णय की सम्युक्ति की गयी। तथा कॉन्सिल ने प्रश्नपत्र-पैटर्न में परिवर्तन की संसाधनों की अपलब्धि के अन्तर्गत यथाशीघ्र बदलाव का सुझाव दिया।

एजेण्डा क्रमांक 2. विभिन्न अध्ययन मण्डलों द्वारा स्वीकृत पाठ्यक्रमों में सम्बन्धित द्वारा किये गये परिवर्तनों के औचित्य एवं विभागाध्यक्षों द्वारा उद्बोधन दिया गया। तत्पश्चात् सर्वसम्मति से इसका अनुमोदन कर पाठ्यक्रमों को स्वीकृति प्रदान की गयी।

एजेण्डा क्रमांक 3 - प्राचार्य की अनुमति से MSc. भौतिकशास्त्र के III एवं IV सेमेस्टर कैलेंडर प्रयोगिक उपकरणों के उपलब्धता की चर्चा प्रो० तिवारी द्वारा किया गया। प्रत्येक उपकरण की जानकारी दी गयी कि उपकरण कम की प्रक्रिया जारी है। अध्ययन मण्डल के सदस्यों द्वारा प्रयोगिक उपकरणों की उपलब्धता के तत्पश्चात् स्वशासक निदेशक डॉ० डी०के० वर्मा

द्वारा आगन्तुकों का आवागमन किया गया।

  
परीक्षा नियंत्रक

  
प्राचार्य

