भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान बरहमपुर
Indian Institute of Science Education and Research Berhampur
Established by the Ministry of Education, Govt. of India

# अभिषद
# Senate

# 22वी बैठक के कार्यबृत
# Minutes of
# 22nd Meeting

20 December 2024 (Friday)
2: 30 PM- 5:30 PM
Board Room, Permanent Campus, IISER Berhampur

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# Indian Institute of Science Education and Research Berhampur

# Senate

## Minutes of the 22nd Meeting

20 December 2024 (Friday) at 2:30 pm

Board Room, IISER Berhampur

The 2024-2/22nd meeting of the Senate, IISER Berhampur was held on 20 December 2024 (Friday) at 2:30 pm in the Boardroom (through Hybrid Mode). The following members were present:

| | | |
|---|---|---|
| 1. | Prof. Ashok Kumar Ganguli,Director, IISER Berhampur | Chairperson |
| 2. | Prof. Tara Chandra Kandpal, Former Professor, Department of Energy Science & Engineering and Former Dy Director, IIT Delhi (Joined online) | Member |
| 3. | Prof. K George Thomas, Professor of Chemistry and Dean of Faculty Affairs, IISER Thiruvananthapuram (Joined online) | Member |
| 4. | Dr. Prosenjit Mondal, Professor, Biological Sciences and Dean (Faculty Affairs) (Joined online) | Member |
| 5. | Prof. Joydip Mukhopadhyay, Head, EES and Dean (International Relations) | Member |
| 6. | Dr. Thirupathi Barla, Dean(R&D) (Joined online) | Member |
| 7. | Dr. Ritabrata Sengupta, Associate Dean, Academic Affairs HoD, Computer Sciences | Member |
| 8. | Dr. Malay Kumar Rana, Associate Professor, HoD (Chemical Sciences) (Joined online) | Member |
| 9. | Dr. Prem Prakash Pandey, Associate Professor, HoD (Mathematical Sciences) | Member |
| 10. | Dr. Bodhisatta Nandy, Associate Professor, HoD (Biological Sciences and Student Affairs) | Member |
| 11. | Dr. Shashi Bhusan Singh, Associate Professor, HoD (Physical Sciences) (Joined online) | Member |
| 12. | Dr. Nihar Kanta Patra, Librarian | Member |

| | | |
|---|---|---|
| 13. | Dr. R Selvi Bharathavikru, Assistant Professor, Associate Dean, Outreach (Joined online) | |
| 14. | Dr. Victor Mukherjee, Assistant Professor, Physical Sciences (Joined online) | Member |
| 15. | Mr. Amal Chacko, Student Representative-UG (Joined online) | Member |
| 16. | Ms. Bandita Das, Student Representative-PhD (Joined online) | Member |
| 17. | Dr. Prosenjit Daw, Assistant Professor, Coordinator, Academic Affairs (PG) | Special Invitee |
| 18. | Shri Pradeep Kumar Ray, Registrar | Secretary |

The following members could not attend the meeting:

| | | |
|---|---|---|
| 1. | Prof. Reetika Khera, Professor of Economics, IIT Delhi | Member |
| 2. | Dr. Shikha Gandhi, Assistant Professor, Chemical Sciences | Member |
| 3. | Dr. Natasha Sharma, Assistant Professor, Physical Sciences and Warden | Member |
| 4. | Dr. Arunkumar Krishnan, Assistant Professor, Biological Sciences | Member |
| 5. | Dr. Jose Sebastian, Assistant Professor, Coordinator, Academic Affairs (UG) | Special Invitee |
| 6. | Dr. Chandan Maity, Coordinator, Academic Affairs | Special Invitee |

The following are the outcomes of the Senate Meeting:

| S.No. | Items |
|---|---|
| 21.1 | The Chairperson of the Senate extended a warm welcome to all Senate members on a happy note as this is the first meeting of the Senate on the Permanent Campus of IISER Berhampur. The members were apprised that during the last one and a half years, remarkable steps have been taken to improve the Institute's academic standard by revamping various processes, guidelines, and regulations. Thereafter, the following agenda items were taken up. |
| **22.1.1** | Confirmation of Minutes of the 21st Meeting of the Senate held on 29 July 2024 |

<table>
<tr><td></td><td>After the circulation of the Minutes of the Meeting, a few members shared their inputs. After a detailed discussion on the inputs, the Senate approved the following:<br>Change in requirements in PhD thesis submission: The Associate Dean, Academic Affairs (ADoAA) requested a review for the decision taken in the last Senate. After deliberation, the members decided that:<br>1. the student should have at least one published/accepted paper as a major contributor or the lead author in a recognised research journal before submitting the thesis synopsis, and<br>2. the thesis should be evaluated by at least one Indian examiner, at least one foreign examiner, and the mentor.<br>The requirement for an RPC committee member to evaluate the thesis, other than the mentor, was scrapped. After deliberation, the Senate suggested implementing the proposal for any thesis submitted on or after 1st of January 2025.</td></tr>
<tr><td>21.1.2</td><td>Report on Action Taken on Decisions of the 21st Meeting held on 29 July 2024</td></tr>
<tr><td></td><td>The Senate noted the following action taken report on the decisions of the Senate made in its 21st Meeting held on 29 July 2024:
<table>
<tr><th>Item</th><th>Discussion Item</th><th>Action Taken</th></tr>
<tr><td>21.2.1</td><td>Changes in the PhD curriculum</td><td>Being implemented</td></tr>
<tr><td>21.2.2</td><td>Introduction of "FA" grade and Award of "AU" grade</td><td>Implemented</td></tr>
<tr><td>21.2.3</td><td>Registration for the minor degree</td><td>Being implemented</td></tr>
<tr><td>21.2.4</td><td>Introduction of new courses and revision of existing course contents</td><td>Implemented</td></tr>
<tr><td>21.2.5</td><td>Rationalising course codes for the Computational Data Sciences minor program</td><td>Implemented</td></tr>
<tr><td>21.2.6</td><td>To consider and recommend to the BoG for award of BS-MS, MS degree, and PhD Degree</td><td>Implemented</td></tr>
<tr><td>21.2.7</td><td>To consider and approve the award of various medals to BS-MS students during the 4th Convocation</td><td>Implemented</td></tr>
</table></td></tr>
<tr><td>22.2</td><td>Discussion Items</td></tr>
<tr><td>22.2.1</td><td>Revision in course content proposed by the Department of Biological Sciences</td></tr>
<tr><td></td><td>The proposal for revision of the following courses was presented:<br>1. BIO306: Animal Forms and Functions (4 credit)</td></tr>
</table>

2. BIO308: Biology Laboratory II (3 credit)
3. eBIO 404: eBIO lab II (3 credit)
4. BIO416: Biology Laboratory IV (3 credit)

After detailed deliberation the senate approved the courses with changes in credit structure, teaching hours, references, objective and learning outcomes. The revised document is placed at **Annexure-1**. The Senate suggested the following for further discussion in the Academic Development Committee (ADC):

1. There should be uniformity in the course template and the structure of 3 / 4 credits (In L-T-P-C, L denotes the number of lecture classes per week, T denotes the number of tutorial classes per week, P denotes the number of practical classes per week, and C denotes the credits of the course.) have to be mentioned clearly including the teaching hours for the lectures, tutorials etc. For the three credit courses, there should be 42 teaching hours.
2. Considering the student's perspective, the pattern of 90-minute classes is to be stopped, and the classes are to be 60 minutes as much as possible. The ADoAA informed that, in principle, this should be followed from the January 2025 semester, subject to the availability of the lecture halls and logistic support. Otherwise, this would be implemented from the 2025-26 academic year.
3. The objective, learning outcomes, prerequisite, evaluation modality, and complete reference have to be mentioned in the course template.
4. Course names should be uniform and at par with other National and International Academic Institutes.

The Senate took the serious view on the matter of revision of course content and advised that the Head of the Department and the committees have to spare some more time while reviewing the course proposals, both new and revision. The teaching load of all faculties is to be distributed uniformly.

**22.2.2** **Revision in course content proposed by the Department of Earth and Environmental Sciences**

| **Existing Credit** | **Proposed Credit** |
|---|---|
| EES 402: Global Climate Change:2 Credits | EES 402: Global Climate Change: 4 Credits |

| | | |
|---|---|---|
| | EES 404: Basin Analysis and Geology of Fuels: 3 Credits | EES 404: Basin Analysis and Geology of Fuels: 4 Credits |
| | EES 408: Sustainability Informatics:4 Credits and EES 412: Practices in Sustainability Informatics (Lab) | Now to be included in the list of elective papers. Students may opt for two Elective papers in the eighth semester instead of one elective. |
| | After detailed deliberation, the Senate approved the courses with changes in credit structure, teaching hours, references, objectives, and learning outcomes. The revised document is placed at **Annexure-2**. The Senate suggested that all courses be reviewed by the Academic Development Committee (ADC) to standardize the credit allotment across departments. | |
| **22.2.3** | **Discontinuation of the course CDS202: Information for Science and Technology** | |
| | The proposal was approved after detailed discussion. | |
| **22.2.4** | **Academic calendar for the AY 2024-25 Semester-II** | |
| | The proposal placed at **Annexure-3** was discussed in detail and approved the same with minor amendments. The general comments/amendments are as follows:<br>1. The preparatory week has to be removed from the calendar. The examination is to be planned after 2-3 days from the last date of teaching. A few days may be specifically marked for laboratory assessments / record submission / viva-voce.<br>2. There should be 14 teaching weeks for a semester.<br>3. For faculty members, visits related to fellowship/collaboration/meetings/conferences during the semester should not be encouraged, and should ideally not exceed beyond 7 days. This is to ensure uncompromised teaching commitments. A detailed guideline is to be prepared and shared with all concerned for its implementation. | |
| **22.2.5** | **Intimation regarding submission of grades for AY 2024-25 Semester-I** | |
| | The Senate noted the point. The project grade submission for BSMS students as per BSMS manual was discussed and the departments that have not submitted the project grades have been informed to complete | |

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| | the grading in a month by 20 January 2024 and submit signed grade reports to the Academic Affairs office. |
| **22.3** | **Ratification Items** |
| **22.3.1** | **Approvals accorded by Chairperson, Senate** |
| | The Chairperson, Senate, accorded approval on the following matters: |

| *SN* | *Item* |
|---|---|
| 1. | Minutes of the 21st Meeting of the Senate held on 29-07-2024 |
| 2. | Minutes of the 16th Meeting of the IAAC |
| 3. | Procedure for releasing monthly TAship/ fellowship to the Ph.D. students |
| 4. | Recovery of Institute Fellowship amount from Ms. Megha Biswas for the period from May to July 2024 in view of her selection to the CSIR-SRF Direct Fellowship |
| 5. | Research Project grades of PhD students |
| 6. | Fellowship extension requests from 11 Ph.D. Students who enrolled before 2021 |
| 7. | Revised Contingency Guidelines for the Ph.D. students on Institute Fellowship |
| 8. | Re-issuing of TC and Degree Certificate to Mr. Dilip Kumar Sahoo |
| 9. | Course Registration of Backlog Students |
| 10. | Approval of the following circulars:<br>a. Amendment in the procedure followed for Ph.D. Thesis evaluation<br>b. Ph.D. guide allocation timeline<br>c. Publication requirement for the PhD students to be eligible for thesis submission<br>d. Revision of clause no. 8.5 in the Ph.D. manual regarding the RPC's composition<br>e. Compulsory non-graded course on Research Methodology and Ethics in Research<br>f. Ph.D. manual's Section 8.2 regarding the academic minimum criteria for the Comprehensive Examination<br>g. Converting the PhD students from the R&D project Fund to the Institute Fund after the completion of project tenure |

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| 11. | Credit Distribution for 5th Year MS Project of the EES Department |
| 12. | Updation of transcripts of Ph.D. students on the ERP Portal |
| 13. | Course drop request of Mr. Iman Mahato after the deadline |
| 14. | Academic Calendar for BS-MS 2024 batch |
| 15. | Budget Allocation for contingency for 5th Year BS-MS students pursuing their project at IISER Berhampur |
| 16. | Restarting of Fellowship of Ms. Abiya R |
| 17. | Ph.D. Admission withdrawal and fee refund to 4 new Ph.D. candidates |
| 18. | Admission withdrawal of new BS-MS students |
| 19. | Constitution of a committee about the feasibility of the course CDS202 |
| 20. | Admission of Ms. Pritichhanda Barik (who joined under the JRF-SERB project in the Department of Chemical Sciences) to the PhD programme |
| 21. | Discontinuation of the UGC Fellowship of Mr. Mahesh Kumar Ram and recovery of the excess amount paid |
| 22. | Nomination of a Professor of the Institute to the BoG-reg |
| 23. | A request of Mr. Kale Somnath Dadabhau for standardization of name format across certificates |
| 24. | Transfer of Bihar student credit card fund in favour of the student Mr. Abhijit Kumar |
| 25. | Regarding the request of a parent for allotment of a vacant seat through spot counselling in the BS-MS programme. |
| 26. | Refund request from a BS-MS student against payment of registration fee for 9th semester |
| 27. | Cancellation of classes scheduled on 21.9.2024 in lieu of cultural event Agomoni |
| 28. | Grade change request of Mr. Achyutan M. |
| 29. | Approval of the Grades of Ms. Mayuka Jonna (23087) Semester-II AY:2023-24 |

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| 30. | Refund request from Ms. Sonali Anant (22134), a BS-MS student against excess payment made towards semester fee (AY 2024-25 Sem 1) |
| 31. | Transfer of Bihar student credit card fund in favour of the student Avinash Kumar |
| 32. | Refund of excess payment made towards admission fee for PwD Category students (1st Year BS-MS Program). |
| 33. | Regarding no instruction day on 7th August 2024 |
| 34. | Appointment of Institute Nodal Officer for State and National Scholarships |
| 35. | Disbursement of scholarship amount to the concerned students |
| 36. | Updation of BS-MS (21-23 batch) and PhD & iPhD (2024 January) grades |
| 37. | Minutes of the 15th Meeting of the IAAC |
| 38. | Disbursement of the teaching assistantship/fellowship to the students enrolled in AY 2023-24 Sem-II |
| 39. | Admission withdrawal of Ms. Adyasha Sahoo (23172) from BS-MS (Dual Degree) |
| 40. | Medical Leave of Ms. Tiasha Das (21147) |
| 41. | Discontinuation of the BS-MS Degree with distinction |
| 42. | Implementation of mandatory 75% attendance for the students to appear in the end sem exam |
| 43. | Uploading of Medium of Instruction certificate in the portal |
| 44. | Admission to Ph.D. programme for the Academic Year 2024-25 (Semester II) |
| 45. | Allocation of major disciplines for BSMS 2022 Batch students and requests for change of 2022 batch |

The Senate ratified all the items mentioned above with the following comments:

1. The proposals within the power of the Director as per the delegation of powers that were approved by the Director should not be included in the ratification items.
2. Two days can be given for the students to see their answer scripts before grade moderation. The grades are to be frozen after approval from the Chairperson of the Senate. Any changes in grade after approval of the Chairperson Senate require detailed justification from the course instructor with the

| | |
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| | recommendation of the Head of the Department and to be approved by the Chairperson Senate. |
| **22.4** | **Any other item with the prior permission of the Chairperson** |
| **22.4.1** | **Approval and release of SRS for AY 2024-25 Semester-I** |
| | The Senate approved the SRS for release to the instructors. |
| **22.4.2** | **Implementation of attendance policy** |
| | It has been appraised to the Senate that the internet issue for implementation of biometric attendance has been resolved and attendance policy will be implemented from AY 2024-25 Semester-II. |

The meeting concluded with a vote of thanks to the Chair and to the members

**Secretary, Senate**

**Approved**

**Chairperson, Senate IISER Berhampur**

3/1/25

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Indian Institute of Science Education and Research Berhampur
Established by the Ministry of Education, Govt. of India

**Office of Academic Affairs**

**Proposal for Revision of Existing Course**

**Department of** Biological Sciences

*(The proposal should be submitted both in hard copy and electronic form (doc and pdf file) using the format given below before the deadlines of submission (Odd semester (proposal submission by March 15) / Even Semester (proposal submission by October 15)). The hard copy is to be sent to the Academic Office and the soft copy to be emailed to Office of Academic Affairs (office_aa@iiserbpr.ac.in) with a cc to Dean, Academic Affairs (doaa@iiserbpr.ac.in).*

| | | | |
|---|---|---|---|
| Course Title | eBIo404: Engineering Biology Lab -II | | |
| Course No | eBio404 | Department Only: | Yes \|✓\| No \|___\| |
| Date of submission | 10.12.2024 | | |
| Credits: | 3 | | |
| For: | BS-MS (Dual Degree) \|✓\| Integrated Ph.D. \|\| Ph.D. \| | | |
| Proposers: | Dr. Vivek Tiwari, Dr. R Selvi Bharatavikhru | | |
| Pre-requisites, if any | NONE | | |
| Others interested faculty: | | | |
| Effective from: | Semester I/II of Academic year 2021-22 | | |

**Details of the course revision**

| | Proposed |
|---|---|
| Course No. | same |
| Structure (please see clause 6.1 in BSMS manual and course contents) | **10 Lab works Credits: 3** |
| Learning Objectives: | On completion of this course the students will be able to:<br>1. Learn the tools and techniques of Neurobiology, Neuroimaging, Cell Biology & Regenerative Medicine<br>2. Gain hands on experience in Neurobiology, Neuroimaging, Cell Biology & Regenerative Medicine experiments. |
| Course Contents: | **Neuroimaging**<br>1) Perform Brain structure volume quantification<br>2) Perform white matter fiber identification and white matter tract quantification<br>3) Perform Radiomic Segmentation of Brain Tumors<br>4) Identifying and Quantitating Dopaminergic Neuronal sites: Neuromelanin based MR detection<br><br>**Stem Cell Biology and Regenerative Medicine**<br>1) ES cell maintenance and culture techniques<br>-Concept of feeder and feeder free culture, characterization of ES cell |

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|---|---|
| | pluripotency by morphological and molecular marker analysis.<br>2) Embryoid bodies and staining for three germ layers- Generation of embryoid bodies and characterization<br>3) Cardioid culturing and characterization<br>4) Gene targeting in ES cells for transgenic purposes (theoretical aspects related to constructs and various approaches, gRNA designing and methods for targeting in ES cells)<br>5) Cancer Stem Cell Markers and characterization through 3D spheroidal culture system |
| Selected Readings: (Texts and References (including e-books and research articles) | Selected Readings:<br>1. Neuroanatomic Segmentation Freesurfer, SPM<br>2. Molecular Cloning, Sampbrook and Russel |
| Type (tick √ as appropriate) | Core/Professional ✓ /Department Elective / Open Elective |

**Justification for revision:**
The existing course content needed streamlining. There are no major modifications as such.

Existing course(s), offered by the same or other Departments which may have significant overlap with the proposed revised course: N/A

| | |
|---|---|
| Any Other information (Please specify) | Structure of the existing course is attached for comparison. |

Name and Signature of course proposers with date:

(i) Instructor(s):

(ii)Alternative instructor(s):

The above proposal followed by the recommendations of the External experts/Senate members/Subject expert(s) appointed by Director is found to be acceptable by the DUGC/DPGC in its meeting held on___. The committee recommended the revision of the existing course for consideration of CoAA/DoAA and Director/Chairperson Senate.

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| 12/1/25<br>Convener, DPGC/DUGC | 02.01.2025<br>FIC/HoD |

**Recommendation of External experts/Senate members/Subject expert(s) appointed by the Director (optional)**

| Description (Add separate sheet, if required)<br><br>Name and signature of Member-1 | Description (Add separate sheet, if required)<br><br>Name and signature of Member-2 |
|---|---|

**For Use of Academic Section**

| Recommended/Not Recommended to Senate Chairperson | Coordinator/Dean, Academic Affairs |
|---|---|
| Recommended//Not Recommended for the approval/ratification by the Senate<br><br>Director/Chairperson Senate | |

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**Indian Institute of Science Education and Research Berhampur**

**Established by the Ministry of Education, Govt. of India**

**Office of Academic Affairs**

**Proposal for revision of an existing course**

**Department of Biological Sciences**

*(The proposal should be submitted both in hard copy and electronic form (doc and pdf file) using the format given below as per the deadlines of submission (Odd semester (proposal submission by March 15) / Even Semester (proposal submission by October 15)). The hard copy is to be sent to the Academic Office and the soft copy to be emailed to Office of Academic Affairs (office_aa@iiserbpr.ac.in) with a cc to Coordinator Academic Affairs (caa@iiserbpr.ac.in).*

| | | | |
|---|---|---|---|
| Course Title | **BIO 306: Animal Forms and Functions** | | |
| Course Level (tick (√ ) in relevant option) | 100 \|__\| 200 \|__\| 300 \|✓\| 400 \| \| 500 \|__\| 600 \|__\| | Semester: VIII | Odd \|\| Even \|✓\| |
| Course Type (tick (√ ) in relevant option) | Core/Professional✓/Department Elective/Open Elective | | |
| Department: | Department of Biological Sciences | | |
| Units/Credits: | 4 | | |
| For: | BS-MS (Dual Degree) \|✓\| Integrated Ph.D. \|✓ \| Ph.D. \| \| | | |
| Proposers: | Arunkumar Krishnan / Bodhisatta Nandy | | |
| Others interested faculty: | | | |
| Prerequisites, if any | NA | | |
| Effective from: | Academic year 2024-25 | | |

**Learning Objectives:**
Essential course on understanding the Biology of animals – including anatomy and physiology of different animal groups. The course connects animal forms (structural diversity) with functions (functional role of the structures), and puts it in the broader context of evolutionary diversification through adaptive evolution and macroevolution.

***Course Content:*** *(Total 42 lecture hours)*

1. Origin and evolution of animal body plans: Characteristic features of Animal body plans including the axis of symmetry, phylogenetic relationships among animals, Body Cavity, Segmentation, Cephalization, Germ layers. **(3 lectures)**
2. Invertebrates: **(5 lectures)**
    - Origin and evolution of different major organ systems. Sponges, Cnidarians, Lophotrochozoans, Ecdysozoans, Echinoderms and Hemichordates.
3. Vertebrates: **(5 lectures)**
    - Origin and evolution of different major organ systems, Tetrapods, Amniotes, Mammals and Humans.
4. Animal Nutrition: **(6 lectures)**
    - Essential Nutrients, Stages of food processing - Ingestion, Digestion, Absorption and Assimilation of food.
    - A brief introduction to the diversity in Invertebrate and vertebrate digestive systems.
5. Circulation and Gas exchange: **(7 Lecture)**
    - Integration of respiratory and circulatory systems in animals, respiratory pigments.
    - Different kinds of respiratory systems: Gills, Trachea, Vertebrate lungs, including air sacs in birds.
    - Vertebrate circulation: Blood and circulation; anatomy of heart, ECG, cardiac cycle, regulation of cardiac output and blood pressure, transport of gasses in blood, regulation of body pH.
6. Osmoregulation and Excretion: **(4 Lectures)**
    - Osmoregulation, osmoregulators and osmoconformers
    - Obligatory exchanges of ions and water
    - Osmoregulation in water and terrestrial environment
    - Human excretory system as a model: Glomerular filtration, Tubular re-absorption and secretion, counter current mechanism, hormonal regulations.
7. Nervous System, Sensory and Motor Mechanisms: **(5 Lectures)**
    - Neuron structure and functions, Genesis of membrane potential and action potential, conduction of action potentials, Sodium-potassium pump, calcium pump, Transmission at synapse, Neurotransmitters.
    - Eye-retinal components and photo-receptors.
    - Ear-cochlea, basilar membrane.
    - Vertebrate skeletal muscle, other types of muscles,
    - Energetics of muscle contraction, sequence of events in contraction & relaxation.
8. Endocrine system: Brief introduction to hormones and their role as chemical coordinator. Vertebrate neuro-endocrine system. **(4 Lectures)**
9. Hormones and Reproduction:
    - Different modes of reproduction: Asexual and sexual reproduction, parthenogenesis. (1)
    - Mammalian reproduction as a model of sexual reproduction: Male and female reproductive physiology, fertilization, pregnancy and childbirth. AIDS, contraceptives - as special topics. **(3 Lectures)**

Selected Readings:


- Introduction to Animal Physiology: Ian Kay; Bios Scientific Publishers; 1st Edition; 1998.
- Animal Physiology: Hill, Wyse and Anderson; Sinauer Associates, Inc; 3rd 2012.
- Animal Physiology by Randall Burggren & French; W. H. Freeman; 5th edition; 2001.
- Principles of Anatomy and Physiology: Tortora and Derrickson; John Wiley and Sons; 13th edition, 2012.
- Textbook on Medical Physiology: Guyton and Hall; Saunders; 12th Edition; 2011.
- Vertebrates: Comparative anatomy, function and evolution: Kenneth V. Kardong; McGraw Hill; 6th Edition, 2009.
- Biology of Invertebrates: Jan Pechenik; McGraw Hill; 7th Edition; 2015.


**Justification for a need of introducing new course:** The exiting (old) version of the course is largely human physiology. The scope of teaching animal forms and their functions is very unclear. In the revision, the contents are clearly worded to bring clarity to the animal topics to be covered. All the older contents are retained. A few new contents have been added. Further, the lecture hour demarcation has been added to help the instructor plan the lectures.

**Existing course(s), offered by the same or other academic units which have significant overlap with the proposed course:**

N/A

| | |
|---|---|
| Any Other information (Please specify): | Content of the existing course is attached at the end. |

Name and Signature of course proposers with date:

(i) Instructor(s): Arunkumar Krishnan

(ii)Alternative instructor(s): Bodhisatta Nandy

The above proposal followed by the recommendations of the External experts/Senate members/Subject expert(s) appointed by Director is found to be acceptable by the DUGC/DPGC in its meeting held on_____.

The committee recommended the introduction ofnew course for consideration of CoAA/DoAA and Director/Chairperson Senate.

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|---|---|
| 2/01/25<br>Convener, ~~DPGC~~/DUGC | 02.01.2025<br>FIC/HoD |

**Recommendation of External experts/Senate members/Subject expert(s) appointed by the Director (optional)**

| Description (Add separate sheet, if required) | Description (Add separate sheet, if required) |
|---|---|
| **Name and signature of Member-1** | **Name and signature of Member-2** |

**For Use of Academic Section**

| | |
|---|---|
| Recommended/Not Recommended to Senate Chairperson | Coordinator/Dean, Academic Affairs |
| Recommended Not Recommended for the approval/ratification by the Senate<br><br>Director/Chairperson Senate | |

**Office of Academic Affairs**

**Proposal for Revision of Existing Course**

**Department of** Biological Sciences

*(The proposal should be submitted both in hard copy and electronic form (doc and pdf file) using the format given below before the deadlines of submission (Odd semester (proposal submission by March 15) / Even Semester (proposal submission by October 15)). The hard copy is to be sent to the Academic Office and the soft copy to be emailed to Office of Academic Affairs (office_aa@iiserbpr.ac.in) with a cc to Dean, Academic Affairs (doaa@iiserbpr.ac.in).*

| | | | |
|---|---|---|---|
| Course Title | **Biology Lab: Biology laboratory II** | | |
| Course No | BIO 308 | Department Only: | Yes \|✓\| No \|___\| |
| Date of submission | 10.12.2024 | | |
| Credits: | 3 | | |
| For: | BS-MS (Dual Degree) \|✓\| Integrated Ph.D. \|✓\| Ph.D. \| | | |
| Proposers: | Dr. Vivek Tiwari, Dr. R Selvi Bharatavikhru, Dr. Prosenjit Mondal | | |
| Pre-requisites, if any | None | | |
| Others interested faculty: | | | |
| Effective from: | Academic year 2024-2025 | | |

**Details of the course revision**

| | **Proposed** |
|---|---|
| Course No. | BIO 308 |
| Structure (please see clause 6.1 in BSMS manual and course contents) | **13 Practicals Credits: 4** |
| Learning Objectives: | 1. Learn the tools and techniques in Biochemistry and Molecular Biology<br>2. Get hands on training on various Biochemistry and Molecular Biology experiments |
| Course Contents: | **Biochemistry Part:**<br>**Experiment 01:** Alpha Amylase (Salivary Amylase) activity assay:<br>a. Activity of enzyme at different time points<br>b. Effect of temperature on the activity of enzyme<br>c. Effect of pH on the activity of enzyme<br>**Experiment 02:** Determination of Blood related parameters: Blood grouping by ABO and Rh system<br>**Experiment 03:** Blood smear preparation & WBC staining by Giemsa's method<br>**Experiment 04:** RBC and WBC counting by using hemocytometer<br>**Experiment 05:** Quantifying Oxidative stress in Cancer Cells: ROS Assay<br>**Experiment 06:** Hemoglobin Estimation (Sahli's Method) |

| | |
|---|---|
| | **Molecular Biology Part:**<br>**Experiment 01:** PRIMER DESIGNING BASICS<br>**Experiment 02:**MOLECULAR CLONING_1: PCR<br>**Experiment 03:**MOLECULAR CLONING_2: RESTRICTION DIGESTION AND ELUTION<br>**Experiment 04:**MOLECULAR CLONING_3: LIGATION AND TRANSFORMATION<br>**Experiment 05:**MOLECULAR CLONING_4:CLONE SCREENING<br>**Experiment 06:**GENE EXPRESSION ANALYSIS_RNA ISOLATION AND SEMI QUANTITATIVE RT-PCR<br>**Experiment 07:**QUANTITATIVE RT-PCR DEMO |
| Selected Readings: (Texts and References (including e-books and research articles) | Selected Readings:<br>1. Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology: Andreas Hoffman and Samuel Clokie, 8th Edition, 2018.<br>2. Enzymes: Biochemistry, Biotechnology, Clinical Chemistry: Trevor Palmer and Philip Bonner Palmer; 2nd Edition, 2008.<br>3. Molecular Cloning: A laboratory manual: Sampbrook J and Green MR; 4th Edition, 2012. |
| Type (tick √ as appropriate) | Core/Professional ✓ /Department Elective / Open Elective |
| **Justification for revision:** The old content was largely unstructured. In the revision, the course has been structured such that there are six major experiments corresponding to Biochemistry, and seven experiments corresponding to Molecular Biology part of the course. These two subjects are also two compulsory subjects taught in this semester. | |
| Existing course(s), offered by the same or other Departments which may have significant overlap with the proposed revised course: N/A | |
| Any Other information (Please specify) | |
| Name and Signature of course proposers with date:<br>(i) Instructor(s):<br>(ii)Alternative instructor(s): | |

The above proposal followed by the recommendations of the External experts/Senate members/Subject expert(s) appointed by Director is found to be acceptable by the DUGC/DPGC in its meeting held on___. The committee recommended the revision of the existing course for consideration of CoAA/DoAA and Director/Chairperson Senate.

| | |
|---|---|
| 2/01/25<br>Convener, DPGC/DUGC | 02.01.2025<br>FIC/HoD |

**Recommendation of External experts/Senate members/Subject expert(s) appointed by the Director (optional)**

| Description (Add separate sheet, if required)<br><br>Name and signature of Member-1 | Description (Add separate sheet, if required)<br><br>Name and signature of Member-2 |
|---|---|

**For Use of Academic Section**

| Recommended/Not Recommended to Senate Chairperson | Coordinator/Dean, Academic Affairs |
|---|---|
| Recommended//Not Recommended for the approval/ratification by the Senate<br><br>Director/Chairperson Senate | |

भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान बरहमपुर

**Indian Institute of Science Education and Research Berhampur**

**Established by the Ministry of Education, Govt. of India**

**Office of Academic Affairs**

**Proposal for revision of an existing course**

**Department of Biological Sciences**

*(The proposal should be submitted both in hard copy and electronic form (doc and pdf file) using the format given below as per the deadlines of submission (Odd semester (proposal submission by March 15) / Even Semester (proposal submission by October 15)). The hard copy is to be sent to the Academic Office and the soft copy to be emailed to Office of Academic Affairs (office_aa@iiserbpr.ac.in) with a cc to Coordinator Academic Affairs (caa@iiserbpr.ac.in).*

| | | | |
|---|---|---|---|
| Course Title | BIO 416: Biology Laboratory IV | | |
| Course Level (tick (√ ) in relevant option) | 100 \|__\| 200 \|__\| 300 \|__\| 400 \|✓ \| 500 \|__\| 600 \|__\| | Semester: VIII | Odd \|\| Even \|✓\| |
| Course Type (tick (√ ) in relevant option) | Core/Professional✓/Department Elective/Open Elective | | |
| Department: | Department of Biological Sciences | | |
| Units/Credits: | 3 | | |
| For: | BS-MS (Dual Degree) \|✓\| Integrated Ph.D. \|✓ \| Ph.D. \| \| | | |
| Proposers: | Pravat Kumar Parida / Vinay Bulusu | | |
| Others interested faculty: | | | |
| Prerequisites, if any | NA | | |
| Effective from: | **Semester VI** of Academic year 2024-25 | | |

Learning Objectives:
On completion of this course the students will be able to:
1) Learn the tools and techniques of Developmental Biology, and Immunology
2) Gain hands on experience on various Developmental Biology, and Immunology experiments

***Course Content: Developmental Biology, and Immunology***

- Differential leukocyte count
- Enzyme linked immunosorbent assay
- Radial immunodiffusion
- Double immunodiffusion test
- Immunofluorescence

- Cuticle Mount to observe Denticular bands in Drosophila embryos or first instar larva
- Reporter Gene Assay, B-gal staining for wingless expression (might replace with in situ)
- Chick embryo staging
- RNA isolation, Semi quantitative PCR
- qRT-PCR
- Tutorial on Gene Expression Analysis
- Spectroscopy

Selected Readings: Texts / References. Web references may be given, especially for ebooks. Complete details of Texts/References should be provided. Book: Authors (Initials & Last name), Title, Edition (Optional), Publisher, Year. Journal Articles: Authors (Initials & Last name), Title, Journal name, Volume, Page nos., Year. Web References: Authors/Organization, Title, Year (if available), URL.). For e references mention the elink.

1) Sambrook and Russell: Molecular Cloning.

2) T. A. Brown: Gene cloning and DNA analysis

3) Glick, Pasternak and Patten: Molecular Biotechnology

**Justification for a need of introducing new course:**

The existing (old) version of the course, there was no experiment to cover Immunology despite Immunology being one of the compulsory theory course in the corresponding semester. Immunology is also fairly experiment intensive and our students need to be exposed to Immunology techniques and experiments for better learning.

| | |
|---|---|
| **Existing course(s), offered by the same or other academic units which have significant overlap with the proposed course:**<br>N/A | |
| Any Other information (Please specify): | Content of the existing course is attached at the end. |
| Name and Signature of course proposers with date:<br>(i) Instructor(s): Pravat Kumar Parida / Vinay Bulusu<br>(ii)Alternative instructor(s): | |

The above proposal followed by the recommendations of the External experts/Senate members/Subject expert(s) appointed by Director is found to be acceptable by the DUGC/DPGC in its meeting held on_____.

The committee recommended the introduction ofnew course for consideration of CoAA/DoAA and Director/Chairperson Senate.

| | |
|---|---|
| Email endorsed<br>Convener, DPGC/DUGC | 14.12.2024.<br>FIC/HoD |

**Recommendation of External experts/Senate members/Subject expert(s) appointed by the Director (optional)**

| | |
|---|---|
| **Description (Add separate sheet, if required)**<br>**Name and signature of Member-1** | **Description (Add separate sheet, if required)**<br>**Name and signature of Member-2** |

**For Use of Academic Section**

| | |
|---|---|
| Recommended/Not Recommended to Senate Chairperson | Coordinator/Dean, Academic Affairs |
| Recommended Not Recommended for the approval/ratification by the Senate<br>Director/Chairperson Senate | |

**BIO 416: Biology Laboratory IV (*Credit,* 3)**

***Course Content: Dev Biology, Techniques in Bio,***

- Cuticle Mount to observe Denticular bands in Drosophila embryos or first instar larva
- Reporter Gene Assay, B-gal staining for wingless expression (might replace with in situ)
- Chick embryo staging
- RNA isolation, Semi quantitative PCR
- qRT-PCR
- Tutorial on Gene Expression Analysis
- Spectroscopy

## Annexure-2

**Modifications of BS-MS course from the EES Department**

Some Modifications in credit distribution suggested in the eight semester of the existing BS MS major Course structure (**Annexure)** is proposed below (to be effective from January 2025, Even Semester).

| Semesters | Existing Credit | Proposed Credit | Remarks |
|---|---|---|---|
| Semester VIII | EES 402: Global Climate Change: 2 Credits | EES 402: Global Climate Change: 4 Credits | Considering the immense impact of climate change, the scope of this course has been enlarged. The revised course content is attached. |
| | EES 404: Basin Analysis and Geology of Fuels: 3 Credits | EES 404: Basin Analysis and Geology of Fuels: 4 Credits | Considering the practical aspects and multidisciplinary nature (involving Geology, Geophysics and Exploration) the scope of this course has been enlarged. The revised course content is attached. |
| | EES 408: Sustainability Informatics: 4 Credits and EES 412: Practices in Sustainability Informatics (Lab) | Now to be included in the list of elective papers. Students may opt for ***two*** **Elective papers** in the eighth semester instead of one elective . | |

**VIII Semester course structure**

## VIII Semester

| Course No. | Course Name | Class Hr | Lab Hr | Tut Hr | Field Work | Total Credit |
|---|---|---|---|---|---|---|
| EES 402 | Global Climate Change | 3 | 0 | 0 | 0 | 4 |
| EES 404 | Basin Analysis & Geology of Fuels | 3 | 0 | 0 | 0 | 4 |
| EES 406 | Geohydrology | 3 | 2 | 0 | 0 | 4 |
| **Elective-1 | | 3 | 0 | 0 | 0 | 3 |
| **Elective- 2 | | 3 | 0 | 0 | 0 | 3 |
| **Total** | | **15** | **2** | **0** | **0** | **18** |

## **Electives Semester VIII (ANY TWO)

| Course No. | Course Name | Class Hr | Lab Hr | Tut Hr | Total Credit |
|---|---|---|---|---|---|
| EES 408 | Sustainability Informatics & Practices | 3 | 0 | 0 | 3 |
| EES 414 | Atmospheric Science | 3 | 0 | 0 | 3 |
| EES 416 | Aerosol Science | 3 | 0 | 0 | 3 |
| EES 418 | Indian Monsoon and Variability | 3 | 0 | 0 | 3 |
| EES 420 | Mineral Exploration | 3 | 0 | 0 | 3 |
| EES 422 | Statistics & Analytics for Earth & Environment Science (EES) | 3 | 0 | 0 | 3 |
| EES 424 | Isotope Geochemistry | 3 | 0 | 0 | 3 |
| EES 426 | Marine Biogeochemical Cycle | 3 | 0 | 0 | 3 |
| EES 427 | Conservation of Nature & Natural Resources | 3 | 0 | 0 | 3 |
| EES 428 | EIA and Environmental Planning | 3 | 0 | 0 | 3 |
| EES 429 | Earth Surface Processes | 3 | 0 | 0 | 3 |

**Salient Changes proposed:**

a) Students may opt for ***two*** Elective papers in the eighth semester

b) Credits for EES 402 and EES 404 to be increased to 4 for each. The course contents have revised accordingly.

c) EES 408 and EES 412 are now combined into EES 408 and included in the list of Electives

## Modification of EES 402 and EES 404

| | | | |
|---|---|---|---|
| **Course Title** | **EES 402 : Global Climate Change** | | |
| Course Level (tick (√ ) in relevant option) | 100 \|__\| 200 \|__\| 300 \| \| 400 \|√_\| 500 \|__\| 600 \|__\| | Semester: | Odd \| \| Even \|_√_\| |
| Course Type (tick (√ ) in relevant option) | Core/√ Professional/Department Elective/Open Elective/Minor√: **Major/Minor** | | |
| Department: | Earth And Environmental Science | | |
| Units/Credits: | 4 (Lecture : + Tutorial: 0 + Fieldwork:0+Self-study: ) | | |
| For: | BS-MS (Dual Degree) \| √ \| Integrated Ph.D. \|___\| Ph.D. \|__\| | | |
| Proposers: | Prof. Joydip Mukhopadhyay<br>Dr. Azhar Shaikh<br>Dr. Tushar M. Chakraborti | | |
| Others interested faculty: | | | |
| Prerequisites, if any | All EES 300 level | | |
| Effective from: | Semester √ VIII of Academic year 2024-25 | | |

**Learning Objectives:**

This course provides an introduction to the science of climate change. The climate system evolves through time under the influence of its own internal dynamics and due to changes in external factors that are called forcings. The course is divided into four parts: (i) Understanding the drivers and factors shaping the Earth's climate; (ii) Meteorological consequences of climate variability and change; (iii) human influence on climate variability and change; (iv) Global emission scenarios and climate change globally and regionally. Upon completion of this course, students will learn the different aspects of the science of climate change as well as specific regional issues of climate change with reference to South Asia.

**Course Content**:

**Unit-1: Introduction to the Science of Climate Change**

Climate system and its key elements – Geosphere, cryosphere, hydrosphere, atmosphere and biosphere; Key concepts in climate science; Indicators of climate change (global and regional surface temperature, sea-level, ocean acidification, ice-sheets and glaciers, greenhouse gas concentrations, extreme events); Drivers of climate change; Observations on issues of climate change through space and time.

**Unit-2: The Earth's Changing Climate**

Forcing: Natural - Variation in Earth's orbit; Variation in solar output; Climate change due to atmospheric constituents (derived from volcanic eruptions, mineral dust); Anthropogenic - Increase in greenhouse gases, aerosols; change of Land use pattern. Feedback mechanisms in the climate systems: Air-sea interactions, cloud-albedo, carbon cycle and accumulation of CO2 in the atmosphere; Description of various effects of atmospheric greenhouse gas accumulation in the climate system; Aerosols (direct, semi- direct, and indirect effects). Millennium scale climate change and variability: Proxies and archives, reconstruction from tree rings, lake sediments and speleothems; Concept of Medieval Warming Period and the Little Ice Age, droughts and mega-droughts, PAGES2K, temperature reconstructions (global).

**Unit-3: Radiative Forcing and Budget**

Concept of Radiative forcing (RF), natural (solar irradiance, volcanic) and anthropogenic (green house gases, ozone and stratospheric water vapor, aerosols and cloud effects, land surface change) RF; Time evolution of RF; Uncertainty associated with RF; Future RFs.

**Unit-4: Climate Model Chain and Evaluations**

Earth system models, atmospheric general circulation model, regional climate models and their characteristics; Techniques (evaluation, multi-model ensemble) of assessing climate models; Regional climate downscaling skills and added value; Climate sensitivity and climate feedbacks.

**Unit-5: Global Climate Change Projections**

Climate model ensembles and source of uncertainty from emission to projection, projected changes for next century (temperature and energy budget, water cycle, circulation, ocean, and cryosphere); Abrupt climate change.

**Unit-6: Regional Climate Projections and Impacts**

Regional meteorology; Regional climate model high-resolution climate validation and projection for India; Regional projection focus on monsoon - ENSO, atmospheric circulation; Agriculture, water resources, energy, health; Climate extremes (frequency, occurrence, and intensity), sea level rise, scale of melting of glaciers, concept of green economy.

**Unit -7 Climate change and Global Ocean**

Impact of climate change on Ocean surface temperature and on thermocline structure. Climate change and prominent ocean variability such as ENSO, IOD, AMO. Climate change and its impact on ocean atmosphere interaction. Impact of climate change on Arctic and Antarctic ice.

**Unit-8 Climate change and global general circulation**.

Impact of deforestation on climate change. Non-conventional energy source and its potential role in mitigating climate change. Climate change and vector borne diseases.

**Suggested Reading:**


1. Dessler, A., 2012, Introduction to Modern Climate Change, Cambridge University Press.
2. Ruddiman, W. F., 2001, Earth & Climate: Past and Future, W. H. Freeman amp; Co Ltd.
3. Pant, G. B., and Rupa Kumar, K., 1997, Climate of South Asia, Wiley.
4. McGuffie, K., and Henderson-Sellers, A., 2014, The Climate Modelling Primer (4 th Edition), Wiley.

5. Krishnan et al. 2020, Assessment of climate change over the Indian region. A report by MoES, Published by Springer

Justification for a need of modification: This course is basic course for climate science. As an interdisciplinary science for students of Earth and Environmental Science the course content needs some more elaborations.

| | | | |
|---|---|---|---|
| **Course Title** | **EES 404 : Basin Analysis and Geology of Fuels (4)** | | |
| Course Level (tick (√ ) in relevant option) | 100 \|__\| 200 \|__\| 300 \| \| 400 \|√_\| 500 \|__\| 600 \|__\| | Semester: | Odd \| \| Even \|_√_\| |
| Course Type (tick (√ ) in relevant option) | Core/√ Professional/Department Elective/Open Elective/Minor√: **Major** | | |
| Department: | Earth And Environmental Science | | |
| Units/Credits: | 4 (Lecture : 04 + Tutorial: 0 + Self-study: ) | | |
| For: | BS-MS (Dual Degree) \| √ \| Integrated Ph.D. \|___\| Ph.D. \|__\| | | |
| Proposers: | Prof. Joydip Mukhopadhyay<br>Dr. Azhar Shaikh<br>Dr. Tushar M. Chakraborti | | |
| Others interested faculty: | | | |
| Prerequisites, if any | All EES 300 level | | |
| Effective from: | Semester √ VIII of Academic year 2024-25 | | |

**Learning Objectives:**

Mineral and fossil fuels constitute an essential resource for energy production. This course endeavors to introduce students to various aspects of these resources such as the nature, distribution, occurrence, genesis, and the reserves in India. In the case of petroleum, the aspects covering reservoir rocks, migration, trapping mechanisms and role of plate tectonic settings will be discussed. Additionally, non-conventional hydrocarbons such as gas hydrates and their potential will be introduced. In coal geology some of of the organic matter in coal petrology will also be covered. Further the potential for coal-bed methane will also be discussed. Lastly, the methods of exploration for atomic minerals will be introduced here.

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Unit-1: Facies models for siliciclastic depositional systems: deep-sea fan, alluvial-fluvial, delta, shelf.

Unit 2: Carbonate platforms: general characteristics, types and facies models of carbonate shelf, ramp and rimmed shelf

Unit: 3: Sequence Stratigraphy: principles, Definition of sequence stratigraphic surfaces, sequence. Examples from siliciclastic and carbonate depositional systems

Unit-4: Petroleum Geology

Petroleum - Its different states of natural occurrence, chemical composition and physical properties of crude in nature, origin of petroleum, concept of kerogen and its kerogen; Biogenic and thermal effect; Reservoir rocks - general attributes and petrophysical properties; Classification of reservoir rocks - fragmental reservoir rocks and chemical reservoir rocks; Concept of flow unit; Migration of oil and gas - Geologic framework of migration, short and long distance migration, primary and secondary migration; Geologic factors controlling hydrocarbon migration, forces responsible for migration, migration routes and barriers; Hydrocarbon traps - Definition, anticlinal theory and trap theory, classification of hydrocarbon traps, time of trap formation and time of hydrocarbon accumulation; Cap rocks – definition and general properties; Formation water characteristics as tool oil exploration; Plate tectonics and global distribution of hydrocarbon reserves; Classification of Indian petroliferous basins and petroleum geology of Assam, Bengal, Cauvery, Krishna-Godavari, Cambay and Bombay offshore basins; Natural gas hydrates and its potentialities.

Unit-5: Coal Geology

Coal and its properties - Different varieties and ranks of coal; Origin of coal; Types of depositional processes; Coalification processes and its causes; Sediments closely associated with coal (coal balls, tonsteins, seat-earths, under-clays, fire-clays and soils); Lithotypes, microlithotypes and macerals, Maceral analysis of coal; Mineral and organic matter in coal; Application of coal geology in hydrocarbon exploration; Coal-bed methane - Maturation of methane in coals, coal as a reservoir, fundamentals of coal bed methane exploration and production; Methods of coal prospecting and estimation of coal reserves; Application of coal petrography, proximate and ultimate analyses, industrial evaluation of coal characteristics with reference to coal classification; Geological setting and characteristics of different coalfields and lignite fields of India; Uses of coal for various industries e.g. carbonization, liquefaction, power generation, gasification and coal-bed methane production, Ideas on Metamorphism of Coal.

Unit-6: Nuclear Geology

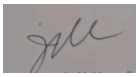
Radioactivity and radioactive decay, growth and decay mechanisms (α β γ decay), decay units and dosage, concept of neutron activation through time; Mineralogy of U and Th bearing economic minerals, geochemistry of U-Th and their distribution in ore bodies through geologic time; U and Th metallogenic provinces of India; Detectors of radioactivity - Geiger, proportional and scintillation counters and spectrometers, Role of illite as a useful tracer for Uranium Exploration

**Suggested Reading**


1. Catuneanu, Octavian; 2022, Principles of Sequence Stratigraphy, Elsevier, 2nd Edition.
2. Walker, R. G., 2006 Facies Models Revisited, https://doi.org/10.2110/pec.06.84.0001
3. Wright, V. P., Tucker, M. Carbonate Sedimentology, Wiley, DOI:10.1002/9781444314175
4. Selley, R. C., and Sonnenberg, S. A., 2014, Elements of Petroleum Geology (3 rdEdition), Academic Press.
5. Chilinger, G. V., Buryakovsky, L. A., Eremenko, N. A., and Gorfunkel, M. V., 2005, Developments in Petroleum Science-Geology and Geochemistry of Oil and Gas (Volume 52), Elsevier Science.
6. North, F. K., 1985, Petroleum Geology, Springer Netherlands.
7. Chandra, D., Singh, R. M., and Singh, M. P., 2000, Textbook of Coal (Indian Context), Tara Book Agency.
8. Singh, M. P., 1998, Coal and organic Petrology, Hindustan Publishing Corporation.
9. Aswathnarayana, U., 1985, Principles of Nuclear Geology, Routledge.
10. Dahlkamp, F. J., 1993, Uranium Ore Deposits, Springe-Verlag.

Justification for a need of introducing new course: This course is basic course for introducing fuel geology and aspects of exploration. Given the multi-specialization domains for fuel exploration, the scope has been enlarged.

Name and Signature of course proposers:

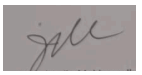


Prof. Joydip Mukhopadhyay Dr. Azhar Mohammed Shaikh Dr. Tushar M. Chakraborti

**Recommendation of External experts/Senate members/Subject expert(s)**

| Description (Add separate sheet, if required) | Description (Add separate sheet, if required) |
|---|---|
| Prof. Jyotisankar Ray, Calcutta University | Prof. Arijit Ray, Presidency University |

The above proposal followed by the recommendations of the External experts/Senate members/Subject expert(s) appointed by Director is found to be acceptable by the DUGC/DPGC in its meeting held on_____. The committee recommended the introduction of new course for consideration of CoAA/DoAA and Director/Chairperson Senate.

| | |
|---|---|
|   Dr. Azhar Shaikh Dr. Tushar Mouli Chakraborti Convener, DUGC Convener, DPGC |  Prof. Joydip Mukhopadhyay FIC/HoD |

**For Use of Academic Section**

| | |
|---|---|
| Recommended/Not Recommended to Senate Chairperson | Coordinator/Dean, Academic Affairs |
| Recommended / Not Recommended for the approval/ratification by the Senate<br><br>Director/Chairperson Senate | |

| AY 2024-25 Semester-II (January - May 2025) | |
|---|---|
| **Event** | **Schedule** |
| Pre-registration (for existing students) | December 31, 2024 - January 03, 2025 (Tue-Fri) |
| Registration (for existing and new students) | January 01 - January 03 (Wed-Fri) |
| Classes Commence | Jan 06 (Mon) |
| Senate Meeting 1 | In the week of Jan 13 - Jan 18 |
| Late Registration with Fine (INR 1000/-) | Jan 17 (Fri) |
| Last date of add/drop | Jan 17 (Fri) |
| Class Committee Meeting | In the week of Feb 17 - 21 |
| Lecture compensating Saturday | Feb 22 (to compensate for the lecture on the holiday of Feb 26, Wednesday) |
| IAAC Meeting | In the week of Feb 24 - 28 |
| Mid-semester examination | Mar 01 - Mar 08 (Sat-Sat) |
| Mid-semester Vacation | Mar 09-16 (Sun-Sun) |
| Last date of document submission (For new Entrants) | Mar 10 (Monday) |
| Last date for dropping overload course | April 04 (Fri) |
| Lecture compensating Saturday | April 05 (to compensate for the lecture on the holiday of March 31, Monday) |
| Lecture compensating Saturday | April 12 (to compensate for the lecture on the holiday of April 10, Thursday) |
| Lecture compensating Saturday | April 19 (to compensate for the lecture on the holiday of April 18, Friday) |
| PhD interviews | Between April 21 - May 02 |
| Pre-registration for Next semester | April 21 - 25 (Mon-Fri) |
| SRS | April 21 - 25, 2025 (Mon-Fri) |
| Deadline for submission of Ms project reports | April 23 (Wed) |
| Last day of instruction | April 25 (Fri) |
| Laboratory Exams and Ms project presentations | April 28 - May 02 (Mon - Fri) |
| Ms project presentation | April 28 - May 02 (Mon - Fri) |
| IAAC meeting | In the week of April 28 - May 02 |
| End-semester examination | May 03 - May 10 (Sat - Sat) |
| Summer Vacation (for 1st year to 4th year Bs-MS students) | May 11 - Aug 03 (Sun-Sun) |
| Make-up Examination | May 12-13 (Mon-Tue) |
| Senate Meeting 2 | In the week of May 12-16 |
| Last date for showing evaluated answer scripts | May 14 (Wed) |
| Grade moderation day | May 15 (Thu) |
| Last date for grade submission (including grade for MS thesis) and conversion of 'I' grade | May 16 (Fri) |
| Summer vacation for faculties | May 17 - Jul 28 |
| Deadline for grade change request | May 23 |
| Commencement of classes for 2025-26 Semester-I (Jul-Dec 2025) | Aug 01 (Fri) |
| | |
| **Re-examination 2025** | |
| **Event** | **Schedule** |
| Registration | May 19-May 23 (Mon-Fri) |
| Senate Meeting 3 | June last week / July 1st week |
| Examination | July 01- July 04 (Tue - Fri) |
| Last date for Grade Submission for Re-examination | July 11 (Fri) |
| Convocation | In the week of July 28 - Aug 01 |