

GOAUNIVERSITY
Taleigao Plateau, Goa 403 206

MINUTES

of the 2nd Meeting of the
STANDING COMMITTEE
OF THE
VIII ACADEMIC COUNCIL

Held on
Thursday, 19th March, 2015

D 3	REPORTS OF BOARD OF STUDIES
D 3.1	Minutes of the meeting of the Board of Studies in Botany held on 27/10/2014 The Standing Committee of the Academic Council approved the minutes of the meeting of Board of Studies in Botany held on 27/10/2014 with the following observation /decision: (i) The decision to admit XII (Agriculture) passed candidates for the B.Sc. Botany degree course to be notified by issue of Circular. (Action: AR-PG)
D 3.2	Minutes of the meeting of the Board of Studies in Mathematics held on 3/11/2014 The Standing Committee of the Academic Council approved the minutes of the meeting of Board of Studies in Mathematics held on 03/11/2014 with the following observations /decisions: i. The Chairman was informed to bring some uniformity in the nomenclature of subjects. ii. To include in the Admission Handbook that B.A. Mathematics candidates are eligible to answer the entrance examination for admission to M.Sc. Mathematics. iii. Approved the syllabus of PG courses. (Action: AR-PG)
D 3.3	Minutes of the meeting of the Board of Studies in Physics held on 7/11/2014
D 3.12	Minutes of the meeting of Board of Studies in Physics held on 28/01/2015 The Standing Committee of the Academic Council approved the minutes of the meeting of Board of Studies in Physics held on 07/11/2014 and 28/01/2015 with the following observations /decisions: i. Bridge Course to be included in the course structure with indication that the students have to improve their performance. ii. Page no. 7 of the agenda item dated 7/11/2014, at sr.no.2, sixth line "not to be counted in the 80 credit" to be deleted. iii. The syllabus of both theory papers and practical papers for classes of First Year B.Sc. (Four Papers), Second Year B.Sc. (Four Papers) and Third Year B.Sc. (Twelve papers + Two Skill Based Papers) in Physics shall be implemented from 2016-17 onwards. (Action: AR-PG)
D 3.4	Minutes of the meeting of the Board of Studies in Dentistry held on 14/11/2014 The Standing Committee of the Academic Council approved the minutes of the meeting of Board of Studies in Dentistry held on 14/11/2014 with the following observations /decisions: i. With regard to peripheral postings in concerned Departments of the Goa Medical College for P.G. Students in the specialty of Oral Medicine, Diagnosis & Radiology,

GOA UNIVERSITY
DEPARTMENT OF PHYSICS
Form A-7
(See OA-14 of Part A)

Final meetings of BOS and the Sub-committee were held on 21st and 28th Jan 2015 to review the newly amended undergraduate syllabus in the subject of Physics by the Sub-committee.

The following members were present:

BOS members:

1. Prof. R. B. Tangsali (Chairman, Department of Physics)
2. Prof. A.V. Kulkarni (BITS-Pilani, K.K. Birla Goa Campus)
3. Prof. R.V. Pai (Department of Physics, Goa University)
4. Dr. Uma Subramanian (Physics Department)
5. Shri Narayan Bhandodkar (Department of Physics, Govt. College of Arts, Science & Commerce, Qupem-Goa)
6. Prof. E. Desa (**Co-opted Member**)

Sub-Committee members:

1. Shri Sandeep Burye (Department of Physics, Dhempe College)
2. Shri Rajendra (Department of Physics, Carmel College)
3. Shri S. Aga (Department of Physics, Govt. College of Arts and Science, Sanqualim Goa)
4. Dr. Satish Keluskar (Department of Physics, PES College of Arts and Science Ponda Goa.)
5. Shri Pradeep Morajkar (Department of Physics, St. Xavier's College, Mapusa)
6. Shri Narayan Bhandodkar, (Department of Physics, Govt. College of Arts, Science & Commerce, Qupem-Goa)

The following members were absent:

BOS committee members:

1. Prof. S. M. Darmaprakash (Mangalore University)
2. Mr. Rajendra Kanekar (St. Xavier's College, Mapusa)
3. Dr. G.V. Kundaikar (PES College of Arts and Science, Ponda)
4. Dr. Efrem D'Sa (Carmel College, Nuvem) (**with due intimation**)

Sub-Committee members:

- a) Dr. Ananya Das, Chowgule College of Arts and Science, Margao, Goa.

Agenda items for this meeting:

1. Scrutinizing of the undergraduate syllabus framed by the Sub-Committee appointed for the purpose.
2. Approving the syllabus and recommending the same for placing it before the Academic Council for its implementation during the Academic year 2015-16.
3. A.O.B.

Part-A

- (i) Recommendations regarding courses of study in the subject or group of subjects at the Under-graduate level.
 1. The BOS committee members and the sub-committee members fully analyzed the entire undergraduate syllabus framed by the sub-committee during the two sittings between 2.30 p. m. to 5.30 p.m. held on 21st and 28th Jan 2015 and incorporated suitable changes suggested by the members after lengthy discussions, for completeness and better effectiveness of the subject matter at large.
 2. The thoroughly screened, complete syllabus, of both theory papers and practical papers for classes of First Year B.Sc. (**Four Papers**), Second Year B.Sc. (**Four Papers**) and Third Year B.Sc. (**Twelve papers + Two Skilled Based Papers**) in Physics was approved and recommended for its placement before the Academic Council for its recommendation.
The approved syllabus of the courses is placed at **Annexure I**.

Under AOB

1. The Sub-committee at its earlier meeting had suggested that it was necessary to have a relook at the allocation of time of the paper on the basis of marks allotted. It was observed by the BOS committee that duration of 2 hours to answer a paper of 80 marks was inadequate as most of the students would have difficulty in answering the same.
2. It was therefore proposed that the time limit for answering a 80 marks paper be raised to **three hours** or at least to **two and a half hour** thereby doing full justice to the students and the syllabus they study in the course.
3. BOS has accepted the request made by the Sub-committee and has passed a resolution that all the theory papers carrying 80 marks may be of duration of two and half clock hours and not two hours in order to provide appropriate justice to students and the widely covered syllabus they learn.

Part-B

- (i) Scheme of examinations at the under-graduate level

Non-agenda item.

- (ii) Scheme of examinations at the post-graduate level

Non-agenda item.

- (iii) Panel of examiners for different examinations at post-graduate level

Non-agenda item.

Part-C

- (i) Recommendations regarding preparation and publication of selection of reading material in any subject or group of subject and names of persons recommended for appointment to make the selection.

Non-agenda item.

Part-D

Recommendations regarding general academic requirements in the Department of University or affiliated Colleges.

Non-agenda item.

Part-E

- (i) Recommendations of text books for the courses of study at the under-graduate level.

Non-agenda item.

- (ii) Recommendations of text books for the courses of study at the post-graduate level.

Non-agenda item.

Part-F

- (i) The declaration by the Chairman that the minutes were read out by the Chairman at the meeting itself.

Date: Jan, 28th 2015

Signature of the Chairman

Place: Goa University

Part-G

Remarks of the Dean

- (i) The minutes are in order
- (ii) May be recommended for approval of Academic Council
- (iii) Special remarks if any

Date: 18th Feb 2015

Place: Goa University

Signature of the Dean

Annexure 1.

**Bridge Course in Mathematical Methods (2-
Credits)
(30L)**

Syllabus

1. Preliminary Calculus

Differentiation from first principles; products; the chain rule; quotients; implicit differentiation; logarithmic differentiation; Leibnitz' theorem; special points of a function; theorems of differentiation

Integration from first principles; the inverse of differentiation; integration by inspection; sinusoidal functions; logarithmic integration; integration using partial fractions; substitution method; integration by parts; reduction formulae; infinite improper integrals; plane polar coordinates; integral inequalities; applications of integration

2. Series and Limits

Series; Summation of series (arithmetic, geometric); Convergence of infinite series; Operations with series; Power series; Taylor series; Evaluation of limits

3. Partial differentiation

Definition of partial derivative; the total differential and total derivative; Exact and inexact differentials; Useful theorems of partial differentiation; the chain rule; Change of variables; Taylor's theorem for many variable functions; Stationary values of many variable functions; Stationary variables under constraints; Thermodynamic relations; Differentiation of integrals.

4. Vector algebra

Scalars and vectors; Addition and subtraction of vectors; Multiplication by a scalar; Basis vectors and components; Magnitude of a vector; Multiplication of vectors; Equations of lines and planes; Using vectors to find distances; Reciprocal vectors

5. Ordinary differential equations

Linear equations with constant coefficients; Linear equations with variable coefficients; General ordinary differential equations

Books:

Mathematical Methods for physics and engineering

K. F. Riley, M. P. Hobson and S. J. Bence

Cambridge University Press, Cambridge UK (Reprint 2002).

Annexure II

PHO 302 : NEUTRON PHYSICS

(4-Credits)

This course deals with the theory of nuclear reactors at an introductory level.

I. Interaction of Neutrons with Matter: 6L

Interaction of neutrons with matter, cross-section and variation with neutron energy. Neutron flux. Maxwellian distribution. Fissile and fertile materials. Chain reaction and neutron life cycle. Fermi four factor formula k_{eff} .

II. Neutron Diffusion: 7L

Diffusion theory approximation, derivation of diffusion equation. Neutron balance and critical equation. Boundary conditions and extrapolation distance. Diffusion length and its measurement.

III. Slowing down of Neutrons: 12L

Slowing down length, lethargy, slowing down in a mixture. Moderations. Slowing down models.

IV. Calculation of Critical Size of Reactors: 7L

Critical equation. One group model, four factor formula and calculation of parameters. Critical size of sphere and cylinder. Effect of reflector.

V. Power Operation: 12L

Reactor kinetics, mean neutron lifetime. The "In-Hour" equation and stable reactor period. Reactivity changes due to temperature. Fission product poisoning . Fuel burn-up. Measurement of reactor power and period.

VI. Reactor Types and Economics: 7L

Descriptions of MAGNOX, CANDU, fast reactor. Calculation of total generation cost. Comparison with economics of oil fired plant. Influence of economics on nuclear plant design.

VII. Radiological Protection: 3L

Units of radiation and radioactivity. Concept and derivation of safe working levels. Monitoring instruments and methods.

VIII. Reactor Fuels and Materials: 4L

Uranium resources and requirements. Isotope separation. (one method). Fuel reprocessing. Storage and disposal of nuclear waste – consideration of different methods.

IX. Nuclear Policy: 2L

Elements of India's Nuclear Policy. Examples of Policy of other countries.

X. Field trip to a nuclear establishment such as the Dhruva Reactor, Bhabha Atomic Research Centre, Mumbai or Kaiga Nuclear Plant, Karwar or any other power or research reactor complex which gives permission for the visit of students accompanied by the teacher(s) of the course. The visit is to be organized with the aim of helping students better understand and appreciate the structure and complexity of a nuclear reactor. The visit and assessment of its learning is to be done by an Intra Semester Assessment test or part thereof conducted during the semester.

REFERENCES

1. Nuclear Reactor Engineering by S. Glasstone and A. Sesonske. (Van Nostrand Reinhold Co.).
2. Fundamentals of Nuclear Reactor Physics by E. E. Lewis (Elsevier) (2008)
3. Safe Handling of Radioisotopes (Safety Series no. 1) (1958).
4. Atomic Energy Waste. Editor E. Glueckauf, (Butterworths).