GOA UNIVERSITY
Taleigao Plateau, Goa 403 206

MINUTES

Of the 17th Meeting of the

VIII ACADEMIC COUNCIL

Day &Date

26th and 29th February, 2016

Time

10.30 a.m.

Venue
COUNCIL HALL
Administration Block

	(Action AR-PG)
D 3.26	**Minutes of the Board of Studies in Education held on 27th November 2015** The Academic Council approved the minutes of the Board of Studies in Education held on 27/11/2015 along with the syllabus and the Ordinance for the M.Ed. program. **(Action: AR-PG)**
D 3.27	**Minutes of the meeting Board of Studies in Geography held on 10th February, 2016** The Academic Council approved the minutes of the Board of Studies in Geography held on 10/02/2016. The suggestion under AOB was not accepted as the subject matter did not fall within the purview of the BoS. **(Action: AR-PG)**
D 3.28	**Minutes of the meeting of the Board of Studies in Mathematics held on 15th February, 2016** The Academic Council approved the minutes of the Board of Studies in Mathematics held on 15th February, 2016. The Chairperson was instructed to prepare a detailed syllabus for the undergraduate program and submit it back to the Academic Council at the earliest though the same should have been done by the BoS as per earlier directions issued by the House. The Chairperson was also informed to indicate the compulsory papers of the postgraduate program with 'C' and optional to be marked by 'O'. **(Action: AR-PG)**
D 3.29	**Minutes of the meeting of the Board of Studies in Pharmacy held on 22nd February, 2016** The Academic Council approved the minutes of the Board of Studies in Pharmacy held on 22/02/2016. The Chairperson was requested to place the Ordinance for amendments before the Drafting and Vetting Committee. It was also decided to include in the amendment a statement stating that the cut off percentage for admission would be as notified by the Statutory Councils and notified by the University from time to time. **(Action AR-PG)**
D 3.30	**Minutes of the meeting of Board of Studies in Chemistry(UG) held on 18/02/2016 &22/02/2016** The Academic Council approved the minutes of the Board of Studies in Chemistry (UG) held on 18/02/2016 & 22/02/2016 and approved the syllabus for first and second year B.Sc. The House instructed the Chairperson to formulate the T.Y. Syllabus at the earliest. **(Action: AR-PG)**
D 3.31	**Minutes of the meeting of Board of Studies in Konkani held on 25/01/2016 & 09/02/2016** The Academic Council approved the minutes of the meeting of Board of Studies in Konkani held on 25/01/2016. The Chairperson was requested to delete the column pertaining to marks and to retain the hours. The recommendation under Part C for constituting the Editorial Board involving regular teachers was not accepted by the House.

VIII AC- 17
26-02-2016

GOA UNIVERSITY
Taleigao Plateau, Goa 403 206

T A B L E A G E N D A

For the 17th Meeting of the

VIII ACADEMIC COUNCIL

Day & Date

26th February 2016
&
29th February 2016

Time

10.30 a.m.

Venue
COUNCIL HALL
Administration Block

ii. The declaration by the chairman that the minutes were readout by the Chairman at the meeting itself.

Date: 16.02.2016. Sd/-
Place: Khandola, Goa. Signature of the Chairman

Part G. The Remarks of the Dean of the Faculty
i) The minutes are in order
ii) The minutes may be placed before the Academic Council with remarks if any.
iii) May be recommended for approval of Academic Council.
iv) Special remarks if any.

Date:16.02.2016
Place: Khandola, Goa Sd/-

Signature of the Dean

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D 3.28 **Minutes of the meeting of the Board of Studies in Mathematics held on 15th February, 2016**

Part A: (Courses at PG-level)

1. The Proposals of following courses are approved.
   a. MATH-109: Analytic Number Theory (Revised).
   b. MATH-121: Special Function (New).
   c. MATH-211: Algebra (Revised).
   d. MATH-306: Advanced Algebra (Revised).
   (See Annexure II for detailed syllabus)

Part B: Scheme of Examination at PG-Level

NIL

Part C: (Courses at UG-level)

The Proposal for CBCS Program for B.Sc. is approved and all the CORE and DSE courses for the six Semesters have been approved. A proposal for codes of the courses is also put forth for the consideration of the Academic Council. The syllabus for each course is the same as the syllabus of existing courses with same nomenclature that are already approved by the Academic Council. No new course has been proposed.

(See Annexure I for the Proposal)

Part F: Important Points for the Approval of the Academic Council.

1. Proposal of CBCS Courses for B.Sc. Mathematics. **ANNEXURE I (refer page no. 1024)**
2. Syllabus of PG Courses. (ANNEXURE II)

The meeting ended with a formal vote of thanks.

I hereby declare that the minutes are circulated to the members and decisions are informed to the members in the meeting itself.

Place: Goa University (JAYANTHAN, A. J.)

Date: 15th February, 2016 Chairman, Board of Studies in Mathematics.

Part G: The Remarks of the Deans, FNS

1. The minutes are in order.
2. The minutes may be placed before the Academic Council.
3. Important points of the minutes that needs policy decision of the Academic Council to be recorded.

Place: Goa University.

Date: 17.02.2016 The Dean, F.N.S.

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D 3.29 **Minutes of the meeting of the Board of Studies in Pharmacy held on 22nd February, 2016**

PART A

i) Recommendation regarding courses of study in the subject or group of subjects at undergraduate level: **Nil**

ii) Recommendation regarding courses of study in the subject or group of subjects at postgraduate level: **Amendment in OC-27 with regard to admission eligibility to M.Pharm. courses raised to 55% from the existing 50% as per AICTE and PCI guidelines. (3-column format attached) Annexure I (refer page no. 1027)**

PART B

i) Scheme of Examination at undergraduate level : **Nil**

ii) Panel of examiners for different examinations at undergraduate level: Nil

iii) Scheme of Examination at postgraduate level: -**Nil.**

Pl. Note:
1. The broad Title / Names of the Paper/s will be as per UGC pattern. The appropriate code numbers will be generated for the Papers.
2. The detailed syllabus will be prepared largely in tune with the UGC syllabus.
3. The project will be based on the group research methodology course work for 15 hours equivalent to 1 credit in each semester.

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D 3.28 Minutes of the meeting of the Board of Studies in Mathematics held on 15th February, 2016

Annexure I

CBCS Courses in Mathematics for B.Sc.

Type	Credit	Code	Nomenclature
SEMESTER I			
CORE	04	MATHCO-101	**Calculus of One Variable**
CORE	04	MATHCO-102	**Analytic Geometry**
SEMEMSTER II			
CORE	04	MATHCO-201	**Calculus of Two Variables**
CORE	04	MATHCO-202	**Discrete Mathematics**
SEMESTER III			
CORE	04	MATHCO-301	**Numerical Methods**
CORE	04	MATHCO-302	**Probability and Statistics**
SEMESTER IV			
CORE	04	MATHCO-401	**Matrix Algebra**
CORE	04	MATHCO-402	**Differential Equations I**
SEMESTER V			
CORE	04	MATHCO-501	**Analysis I**
CORE	04	MATHCO-502	**Vector Calculus**
ELECTIVE	04	MATHEL-501	Algebra
ELECTIVE	04	MATHEL-502	Analysis II (Riemann Integration)
ELECTIVE	04	MATHEL-503	Number Theory
ELECTIVE	04	MATHEL-504	Operations Research
SEMESTER VI			
CORE	04	MATHCO-601	**Analysis III**
CORE	04	MATHCO-602	**Metric Spaces**

ELECTIVE	04	MATHEL-601	Linear Algebra
ELECTIVE	04	MATHEL-602	Complex Analysis
ELECTIVE	04	MATHEL-603	Differential Equations II
ELECTIVE	04	MATHEL-604	Operations Research II

MATH-306: ADVANCE ALGEBRA

Number of Credits: 4 Introduced in 2016

Prerequisites:: Basic Group Theory, Basic Ring theory and in particular the the Characteristic of an Integral Domain and polynomial Rings over elds and con-struction of elds using irreducible polynomials, and Basic Linear Algebra including basis and dimension of a Linear Spaces, and Linear maps.
Recall of Basics: Groups, Rings and Fields. Examples, Construction of Fields using Polynomial rings.
Splitting Field: Roots of Polynomials, De nition of Splitting Field, Existence and Uniqueness of Splitting Field, Existence and Uniqueness of Finite Fields, Algebraic Closure, Algebraic Numbers, Transcendental Numbers, Transcendence of e.
Galois Theory: Automorphisms of Fields, The Isomorphism Extension Theorem, Normal Series, Jordan Holder Theorem, Solvability of Groups, Galois Group, Ga-lois Group of Finite Fields and Cyclotomic Fields, Abelian Extensions, Symmetric Functions, Fundamental Theorem of Galois Theory, Illustrations of Galois Theory, Insolvability of Quintics.

References

[1] David S Dummit and Richard M Foote, Abstract Algebra, Second Edition, John Wiley & Sons, Inc., 1999.
[2] J.B. Fraleigh, A First Course in Abstract Algebra, Seventh Edition, Pearson International.
[3] I. N Herstein, Topics in Linear Algebra, Second Edition, Wiely Student Edition, 2006.

MATH-211: ALGEBRA

Number of Credits: 4 Revised in 2016

Prerequisites:: Basic Group theory and basic Ring theory. This course is also a prerequisite for courses such as Field Galois Theory, Commutative Algebra, Ad-vanced Number Theory, and Cryptography.
Rings and Fields: Rings, Fields, Integral Domain and Their Characteristic, Field of Quotient of an Integral Domain, Homomorphisms and Factor Rings, Prime and maximal Ideals.
Factorization: Euclidean Domains, Unique factorization domains, Polynomial Rings, Irreducibility of Polynomials, Eisenstein Criterion, Gaussian integers, Fer-mat's theorems on expressing $p = a^2 + b^2$.
Fields Theory: Field Extensions and Degree of Extensions, Irreducible Polynomi-als and Field Extensions, Prime Fields, Algebraic Extensions, Simple Extensions, Transcendental Extensions, Finite Extensions, Geometric Constructions, Separable Extension, Primitive Element Theorem.

References

[4] J.B. Fraleigh, A First Course in Abstract Algebra, Seventh Edition, Pearson International,2002.
[5] I. N Herstein, Topics in Algebra, Second Edition, Wiely Student Edition, 2006
[6] David S. Dummit and Richard M. Foote, Abstract Algebra, Second Edition, John Wiley & Sons, Inc., 1999.

MATH-109: Analytic Number Theory

Number of Credits: **4** **Revised in 2016**

Prerequisites: Some basic Complex Analysis. This course also will serve as Prerequisites to an advanced Course in Analytical Number Theory.

Syllabus:

Recall of basic notions of Divisibility, Congruence, Arithmetical Functions, Quadratic Residues, Quadratic Reciprocity, Jacobi Symbol, Diophantine Equations, Simple Continued Fractions and Fibonacci Numbers has to be done with emphasis on problem solving.

Arithmetical functions and Dirichlet multiplication. Averages of arithmetical functions. Some elementary theorems on distribution of prime numbers. Characters of finite abelian groups. Dirichlets theorem on primes in arithmetic progression. Periodic arithmetical functions and Gauss sums. Primitive roots. Dirichlet series and Euler products. Partition Theory.

Basic Cryptology.

References

[1] T. M Apostol, *Introduction oto Analuytic Number Theory*, Narosa Publishing House.
[2] Heng Huat Chan, *Analytic Number Theory for Undergraduates*, (Monographs in Number Theory), World Scientific, **2009**.
[3] I. Niven, H.S. Zuckerman and H.L. Montgomery, *An Introduction to the Theory of Numbers*,Fifthedition,Wiley-India.
[4] David Burton, *Elementary Number Theory*, Sixth edition, Tata McGraw-Hill Edition.
[5] Thomas Koshy, *Elementary Number Theroy with Applications*, Second Edition, Elsevier India Pvt. Ltd., **2005**.
[6] G.H. Hardy and E.M. Wright, Introduction to theory of numbers.
[7] A. Baker, A concise introduction to theory of numbers, Cambridge University Press.
[8] J. Stillwell, Elements of Number Theory, Springer.

MATH- 121 : Special Functions

Number of Credits: **4** **Introduced in 2016**

Prerequisite: Some basic Complex Analysis and Differential Equations.

Syllabus:

Infinite products:- Introduction, definition of an infinite product, a necessary condition for convergence, the associated series of logarithms, absolute convergence, uniform convergence.

The Gamma and Beta functions:- The Euler and Mascheroni constant g , the Gamma function, a series for $\Gamma^{1}(z)/\Gamma(z)$, evaluation of $\Gamma(1)$ and $\Gamma^{1}(1)$, the Euler product for $\Gamma(z)$, the difference equation $\Gamma(z + 1) = z\Gamma(z)$, the order symbols o and O (small oh and big oh), evaluation of certain infinite products, Euler's integral for $\Gamma(z)$, the Beta function, the value of $\Gamma(z)\ \Gamma(1 - z)$, the factorial function, Legendre's duplication formulae, Gauss' multiplication theorem, a summation formula due to Euler, the behavior of $\log \Gamma(z)$ for large $|Z|$.

The hypergeometric function:- The function F(a,b,c,z), a simple integral form,

F(a,b,c,1) as a function of the parameters, evaluation of F(a,b,c,1), the contiguous function relations, the hypergeometric differential equation, logarithmic solution of the hypergeometric equation, F(a,b,c,z) as a function of its parameters, elementary series multiplications, simple transformations, relation between functions of z and 1–z.

Generalized Hypergeometric Functions: The function pFq, the exponential and binomial functions, the contiguous function relations, a simple integral, the pFq with unit argument. The Confluent Hypergeometric Functions: Basic properties of the 1F1, Kummer's first formula, Kummer's second formula.

Bessel function, Legendre polynomials, Hermite polynomials.

References

[1] G.E. Andrews, R. Askey, R. Roy, Special .Functions, Encyclopedia of Mathematics and its Applications 71, Cambridge University Press, Cambridge.1999.

[2] E.D. Rainville, Special functions, Chelsa Publishing Company, New York, 1960.

[3] N. Saran, S.D. Sharma and Trivedi, Special functions with applications, Pragati Prakashan, 1986.

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D 3.29 Minutes of the meeting of the Board of Studies in Pharmacy held on 22nd February, 2016

Annexure I

DRAFT REVISED ORDINANCE OC-27 RELATED TO M. PHARM COURSE- 22.2.2016			
Sr. No.	Existing	Proposed	Remarks
OC-27.1	A candidate who has passed the **B. Pharm.** Examination of Goa University or an examination of any other Indian University recognized as equivalent thereto with at least **50%** marks in aggregate ***in one and the same sitting*** and with **GPAT** be admitted to the M. Pharm. Course (partly by papers and partly by thesis) in one of the specialisation of Pharmacy mentioned below in which he registers as a post-graduate student. However, if the **GPAT** candidates are not available then the vacant seats shall be filled by admitting the candidates without **GPAT** but who have passed the **B. Pharm**. Examination	A candidate who has passed the **B. Pharm.** Examination of Goa University or an examination of any other Indian University recognized as equivalent, with at least **55%** marks in aggregate as per merit, and having successfully cleared Graduate Pharmacy Aptitude Test (GPAT), shall be eligible for admission to the M.Pharm. However, if candidates with GPAT are not available, then the vacant seats shall be filled by admitting candidates without GPAT, based on the marks obtained at Final year B.Pham. and/or merit obtained at the entrance examination conducted by competent authorities as approved by Government of Goa.	*1. The clause* ***"In one and the same sitting"*** *is deleted as Apex bodies such as PCI and AICTE specifies* **55%** *marks in aggregate only.* ***To comply with the guidelines issued by AICTE and PCI (to be implemented from***