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Central University of Himachal Pradesh

[Established under Central Universities Act 2009]
PO Box: 21, Dharamshala, District Kangra-176215, Himachal Pradesh

Department of Mathematics

Minutes of the Fourth meeting of Board of Studies (BOS) held on 14th June, 2014 at 1.30 P.M.

The Fourth meeting of BOS of the Department of Mathematics was held on 14th of June, 2014 at Temporary Academic Block (TAB), Shahpur at 1.30 P.M.

The following were present:

1. Prof. I.V. Malhan, Chairman & Convenor
2. Prof. Jyoti Prakash, External Expert, HPU
3. Prof. A. K. Mahajan, Director, Centre for Computational Biology & Bioinformatics, CUHP
4. Dr. S. K. Srivastava, Member, Department of Mathematics, CUHP

The decisions taken on various items of Agenda and record of discussions held are as under:

Item-BOS-4.1: To confirm the minutes of the Third Meetings of BOS of the Department of Mathematics held on 29th September 2014.

Decision: The minutes of the Third Meeting of the BOS of the Department of Mathematics were approved.

Item-BOS-4.2: To confirm the action taken by the Department to introduce the new pattern of courses as per UGC guidelines (Annexure-1).

Decision: The BOS approved the Item-BOS-4.2.

Item-BOS-4.3: To confirm the action taken by the Department to introduce the new pattern of examination including question paper etc. (Annexure-2A & 2B).

Decision: The BOS approved the Item-BOS-4.3.

Item-BOS-4.4: To approve the Synopsis of the following students (Annexure-3&4):

S. No.	Name of Student with Roll No.	Name of Supervisor	Area of Research	Date of Joining of student for Ph.D.
1.	Mr. Anil Kumar, CUHP13RDMATH01	Dr. Sachin Kumar Srivastava	Differential Geometry	20 th Dec. 2013

Minutes of the 4th meeting of BOS of the Department of Mathematics held on 14th June 2014

[Signatures]

2.	Ms. Shilpa Sood, CUHP13RDMATH02	Dr. Rakesh Kumar	Fluid Mechanics	20 th Dec. 2013
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Decision: The BOS unanimously approved the synopsis of Anil Sharma and Shilpa Sood.

Item-BOS-4.5: To approve the faculty members to Supervise research work of the following scholars:

S. No.	Name of Student with Roll No.	Name of Supervisor	Area of Research	Date of Joining of student for Ph.D.
1.	Ms. Kanika Sood CUHP15RDMATH01	Dr. Sachin Kumar Srivastava	Differential Geometry	2 nd Dec. 2015
2.	Mr. Ravinder Kumar, CUHP15RDMATH02	Dr. Rakesh Kumar	Fluid Mechanics	4 th Nov. 2015
3.	Ms. Reena Koundal, CUHP15RDMATH03	Dr. Rakesh Kumar	Fluid Mechanics	2 nd Dec. 2015

Decision: The BOS unanimously approved the respective faculty members to supervise research work of Kanika Sood, Ravinder Kumar and Reena Koundal.

Item-BOS-4.5: To approve the proposal of the Department with reference to the requirement of 16 credits for specialization in Industrial Mathematics which was approved by the BOS held on 19th September, 2012 (Annexure-5) and new pattern of courses as per UGC guidelines (where 16 credits of Elective specialization are compulsory for M.Sc. Mathematics (Annexure-1)) that if the student completes 80 credits but does not take full 16 credits of specialization from approved list of Annexure-4 then student may be awarded the degree of M.Sc. Mathematics.

Decision: The BOS unanimously approved the Item-BOS-4.5.

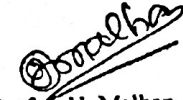
Item-BOS-4.6: Any other item with the permission of the chair.

Decision: None of the members proposed any item for discussion and hence no item was taken up.

The meeting terminated with a vote of thanks to the chair.




 Prof. Jyoti Prakash Prof. A. K. Mahajan Dr. S. K. Srivastava


 Prof. I. V. Malhan
 (Chairman & Convenor BOS, DoM)

Copy to:

1. All the members of BOS, Department of Mathematics for approval.
2. The Registrar & Finance Officer, CUHP, Camp Office Dharamshala for Information and Record.
3. P.S. to Vice-Chancellor for Information of Hon'ble Vice-Chancellor

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School of Mathematics, Computers and Information Science

Department of Mathematics

Fourth Meeting of Board of Studies (BOS), 14th June, 2016

AGENDA FOR FOURTH BOARD OF STUDIES MEETING

Item-BOS-4.1: To confirm the minutes of the Third Meetings of BOS of the Department of Mathematics held on 29th September 2014.

Item-BOS-4.2: To confirm the new course action taken by the Department to introduce the new pattern of courses as per UGC guidelines (Annexure-1).

Item-BOS-4.3: To confirm the action taken by the Department to introduce the new pattern of examination including question paper etc. (Annexure-2A & 2B)

Item-BOS-4.4: To approve the Synopsis of the following students (Annexure-3&4):

S. No.	Name of Student with Roll No.	Name of Supervisor	Area of Research	Date of Joining of student for Ph.D.
1.	Mr. Anil Kumar, CUHP13RDMATH01	Dr. Sachin Kumar Srivastava	Differential Geometry	20 th Dec. 2013
2.	Ms. Shilpa Sood, CUHP13RDMATH02	Dr. Rakesh Kumar	Fluid Mechanics	20 th Dec. 2013

Item-BOS-4.5: To approve the faculty members to Supervise research work of the following scholars:

S. No.	Name of Student with Roll No.	Name of Supervisor	Area of Research	Date of Joining of student for Ph.D.
1.	Ms. Kanika Sood CUHP15RDMATH01	Dr. Sachin Kumar Srivastava	Differential Geometry	2 nd Dec. 2015
2.	Mr. Ravinder Kumar, CUHP15RDMATH02	Dr. Rakesh Kumar	Fluid Mechanics	4 th Nov. 2015
3.	Ms. Reena Koundal, CUHP15RDMATH03	Dr. Rakesh Kumar	Fluid Mechanics	2 nd Dec. 2015

Item-BOS-4.5: To approve the proposal of the Department with reference to the requirement of 16 credits for specialization in Industrial Mathematics which was approved by the BOS held on 19th September, 2012 (Annexure-5) and new pattern of courses as per UGC guidelines (where 16 credits of Elective specialization are compulsory for M.Sc. Mathematics (Annexure-1)) that if the student completes 80 credits but does not take full 16 credits of specialization from approved list of Annexure-4 then student may be awarded the degree of M.Sc. Mathematics.

Item-BOS-4.6: Any other item from the permission of the Chair.

Proposed structure of courses to be offered in the Department of Mathematics (M. Sc. students) as per new Choice Based Credit System (CBCS)

Annexure-1

CORE COMPULSORY COURSES
(40 Credits)

Sr. No.	Course Code	Course Name	Credits	Pre-requisite/ Remarks
1	MTH 403	Linear Algebra	4	
2	MTH 404	Abstract Algebra	4	
3	MTH 406	Real Analysis	4	
4	IAM 401	Complex Analysis	4	
5	IAM 402	Ordinary and Partial differential Equations	4	
6	IAM 405	Fluid Dynamics	4	
7	IAM 407	Differential Geometry	4	
8	MTH 501	Topology	4	
9	MTH 405	Lebesgue Measure and Integration	4	MTH 406
10	MTH 510	Number Theory	4	MTH 406

CORE OPEN COURSES
(12 CREDITS)

Sr. No.	Course Code	Course Name	Credits	Pre-requisite/ Remarks
1	IAM 406	Theory of Elasticity	4	
2	IAM 413	Introduction to Fourier Analysis	4	
3	MTH 410	Fundamentals of Statistics	4	
4	MTH 411	Introduction to Projective Geometry	4	
5	MTH 412	Introduction to Non-Euclidean Geometry	4	
6	MTH 413	Probability Theory	4	
7	MTH 503	Discrete Mathematics	4	
8	MTH 504	Mechanics	4	
9	IAM 503	Mathematical Analysis	4	
10	MTH 508	Graph Theory	4	
11	MTH 512	Introduction to Algebraic Topology	4	
12	IAM 506	Finite Element Methods	4	
13	IAM 516	Spectral Methods	4	
14	IAM 517	Mesh Free Methods	4	
15	IAM 410	General Relativity and Cosmology	4	
16	IAM 526	Integral Equations and Boundary Value Problems	4	
17	MTH 606	Principle of Mathematics and Techniques	4	
18	MTH 516	Introduction to Representation Theory	4	
19	MTH 609	Advanced Algebra	4	MTH 404
20	MTH 619	Mechanics of Fluids	4	
21	MTH 620	Group Analysis of Differential Equations	4	

**ELECTIVE SPECIALIZATION
(16 CREDITS)**

GROUP-I (Choose 12 Credits)				
Sr. No.	Course Code	Course Name	Credits	Pre-requisite/ Remarks
1	IAM 403	Numerical Analysis	4	
2	IAM 404	Mathematical Methods	4	
3	IAM 409	Applied Algebra	4	
4	IAM 501	Functional Analysis	4	
5	IAM 502	Applied Numerical Analysis	4	
6	MTH 407	Numerical Methods	4	
7	IAM 408	Mathematical Modelling	4	
8	IAM 507	Wavelet Theory	4	
9	IAM 508	Image Processing	4	
10	IAM 509	Robotics and Control	4	
11	IAM 510	Artificial Intelligence	4	
12	IAM 511	Computer Aided Design	4	
13	IAM 514	Data Base Management	4	
14	IAM 518	Optimization Techniques	4	
15	IAM 519	Data Structure Techniques	4	
16	MTH 502	Operational Research	4	
17	MTH 623	Introduction Algebraic Geometry	4	
18	MTH 519	Introduction to Commutative Algebra	4	
19	MTH 520	Field Theory and Galois Theory	4	
20	MTH 521	Introduction to Elliptic Curve	4	
21	MTH 522	Analytic Number Theory	4	
22	IAM 521	Advanced Fluid Dynamics	4	
23	MTH 590	M. Sc. Dissertation	12	
24	IAM 602	Computational Methods	4	
25	IAM 603	Applied Functional Analysis	4	
26	IAM 604	Advanced Mathematical Methods	4	
27	IAM 606	Fractional Differential Equations	4	
28	MTH 607	Coding Theory & Applications	4	
29	MTH 608	Advanced Complex Analysis	4	
30	MTH 610	Algebraic Number Theory	4	
31	MTH 611	Advanced Topics in Topology and Analysis	4	MTH 501
32	MTH 614	Differentiable Structures on Manifolds	4	
33	MTH 615	Algebraic Curves	4	
34	MTH 616	Projective Representations of the Symmetric Groups	4	
35	MTH 617	Banach Algebras	4	
36	MTH 618	Differentiable Manifolds and Lie groups	4	MTH 403, MTH 501
37	MTH 408	Partial Differential Equations and Integral Equations	4	
38	MTH 409 A	Complex Analysis	4	

GROUP-II (Choose 4 Credits)

Sr. No.	Course Code	Course Name	Credits	Pre-requisite/ Remarks
1	MTH 507	Approximation Theory	4	
2	MTH 511	Numerical Mathematical Analysis	4	
3	MTH 550	M. Sc. Project	4	
4	IAM 505	Mathematical Modelling and Simulations	4	
5	IAM 550	Project and Seminar based on Practical Training with Industry	4	

ELECTIVE OPEN
(4 CREDITS)

Sr. No.	Course Code	Course Name	Credits	Pre-requisite/ Remarks
1	MTH 401	Ordinary Differential Equations	4	
2	MTH 402	Partial Differential Equations	4	
3	MTH 613	Category Theory	4	
4	MTH 517	Stochastic Differential Equations	4	
5	MTH 505	Fuzzy Sets and Fuzzy Systems	4	
6	IAM 512	Queues and Reliability	4	
7	IAM 513	Computer Graphics	4	
8	IAM 515	Bio-Mathematics	4	
9	MTH 514	Global Differential Geometry	4	
10	MTH 515	Non-Commutative Rings	4	
11	MTH 624	Commutative Algebra	4	
12	MTH 625	Introduction to Homological Algebra	4	
13	MTH 626	Galois Theory	4	
14	MTH 621	Categories and Modules	4	

SKILL DEVELOPMENT
(4 CREDITS)

Sr. No.	Course Code	Course Name	Credits	Pre-requisite/ Remarks
1	IAM 504	Computer Applications	4	
2	MTH 506	Software Lab	4	
3	IAM 524	Mathematical Packages	4	
4	IAM 523	Special Functions	4	
5	IAM 411	Mathematics for Social Sciences	2	
6	IAM 412	Vedic Mathematics	2	
7	IAM 414	Introduction to Geometry	2	
8	IAM 415	Elementary Number Theory	2	
9	IAM 416	Computational Number Theory	2	
10	IAM 525	Financial Mathematics	2	
11	MTH 527	Introduction to Mathematical Statistics	2	

HUMAN DEVELOPMENT

(4 CREDITS)

Sr. No.	Course Code	Course Name	Credits	Pre-requisite/ Remarks
1	MTH 549	Community Lab	4	
2	IAM 520	Theory of Vibrations	4	
3	IAM 598	Project	4	
4	MTH 528	Introduction to Rigorous and Precise Thinking	2	
5	MTH 529	Basics of Propositional Logic	2	

Credit requirement for M.Sc. Programme of Study (4 Semester)

Courses	Category	Percentage	Credits
Core	Compulsory	50%	40
	Open	15%	12
Elective	Specialization	20%	16
	Open	5%	4
Foundation	Skill Development	5%	4
	Human Making	5%	4
Total		100%	80

Semester wise Credit Distribution

Courses	Core		Elective		Foundation		Total
	Compulsory	Open	Specialization	Open	Skill Development	Human Making	
I	16	-----	-----	-----	2	2	20
II	8	4	4	-----	2	2	20
III	8	4	8	-----	-----	-----	20
IV	8	4	4	4	-----	-----	20
Total	40	12	16	4	4	4	80

Mid-Semester Examinations

2 Credit Course				4 Credit Course			
Section	No. of Questions	Marks of each Question	Total Marks	Section	No. of Questions	Marks of each Question	Total Marks
I	5	1 M	5 M	I	10/5	1 M/2 M	10 M
II	2(3)*	5 M	10 M	II	4(6)	5 M	20 M
III	1	10 M	10 M	III	2	10 M	20 M
Grand Total			25 M	Grand Total			50 M

End-Semester Examinations

2 Credit Course				4 Credit Course			
Section	No. of Questions	Marks of each Question	Total Marks	Section	No. of Questions	Marks of each Question	Total Marks
I	5/10	2M/1 M	10 M	I	10/20	2 M/1M	20 M
II	4(6)	5 M	20 M	II	8 (12)	5 M	40 M
III	2	10 M	20 M	III	4	10 M	40 M
Grand Total			50 M	Grand Total			100 M

Distribution of Marks

Component	2 Credit Course	4 Credit Course
Internal Assesment	25 Marks	50 Marks
Mid-Term Examination	25 Marks	50 Marks
End-Term Examination	50 Marks	100 Marks
Total	100 Marks	200 Marks

* 2(3) Indicates that 2 Questions out of 3 Questions

(100)

Approved in the First meeting of Board of Studies (BOS) held on 19th September, 2012

Courses for selecting 16 credits for Specialization in Industrial Mathematics

Course Code	Name of the Course	Credits	Level at which to be offered	Prerequisite	Co-requisite
MTH 407	Numerical Methods	4	4		
MTH 502	Operational Research	4	5		
IAM 403	Numerical Analysis	4	4		
IAM 404	Mathematical Methods	4	4		
IAM 408	Mathematical Modelling	4	4		
IAM 409	Applied Algebra	4	4		
IAM 501	Functional Analysis	4	5		
IAM 502	Applied Numerical Analysis	4	5		
IAM 507	Wavelet Theory	4	5		
IAM 508	Image Processing	4	5		
IAM 509	Robotics and Control	4	5		
IAM 510	Artificial Intelligence	4	5		
IAM 511	Computer Aided Design	4	5		
IAM 514	Data Base Management	4	5		
IAM 518	Optimization Techniques	4	5		
IAM 519	Data Structure Techniques	4	5		
IAM 550	Project and Seminar based on Practical Training with Industry	4	5		

* The above list is included in section Elective Specialization (Group I-Sr. No. 1-16, Group-II-Sr. No.-8) (see Annexure-1)