DEPARTMENT OF MATHEMATICS

Ch. Charan Singh University, Meerut

Date:-25.07.2018

To,

In-Charge Committee Cell

CCS University, Meerut

This is to inform you that a meeting of Board of Studies of Mathematics (for campus only) has been conducted on 07-07-2018. Please find a copy of proceeding of BOS and syllabi Approved by Honb'le Vice Chancellor for further action.

25-7-18

Head

Department of Mathematics
Ch. Charan Singh University
MEERUT-250 004

Department of Mathematics

(1) उमारी सिछेन्ती — 06/08/2018

(2) उमारी केवसाइट —

Syllabi (Mathematics)

University, Meerut, Campus

2018 Onwards

M. Sc.

M. Phil.

Pre-Ph.D. Course Work

CH. CHARAN SINGH UNIVERSITY, CAMPUS, MEERUT
M.SC. (MATHEMATICS) SYLLABI

(2018onwards for M. Sc. part-1, M. Phil., Pre-Ph.D. and 2019 onwards for M. Sc. part-2 also)

M.Sc. Semester I

			hrs/week	L: T: P	Max. marks
1.	M - 101	AbstractAlgebra	6	6:0:0	100
2.	M – 102	Real Analysis	6	6:0:0	100
3.	M – 103	Differential Equations	6	6:0:0	100
4.	M – 104	Metric Spaces	6	6:0:0	100
5.	OE –105	Open Elective	4	4:0:0	100

M.Sc. Semester II

1.	M – 201	Topology	6	6:0:0	100
2.	M – 202	Complex Analysis	6	6:0:0	100
3.	M – 203	Advanced Discrete Mathematics	6	6:0:0	100
4.	M – 204	Operations Research	6	6:0:0	100
5.	OE–205	**Open Elective**	4	4:0:0	100

M.Sc. Semester III

2.	M – 301	Measure and Integration	6	6:0:0	100
2.	M – 302	Mechanics	6	6:0:0	100

3. M – 303   Core- Elective (Any one of the following)

	(I)	Numerical Analysis	6	6:0:0	100
	(II)	Algebraic Coding Theory	6	6:0:0	100
	(III)	Linear Algebra	6	6:0:0	100
	(IV)	Object Oriented Programming in C^{++}	6	4:0:2	100

4. M – 304   Core- Elective (Any one of the following)   6   6:0:0   100

	(I)	Mathematical Methods			
	(II)	Mathematical Statistics			
	(III)	Partial Differential Equations	6	6:0:0	100
	(IV)	Mathematical Programming			

CH. CHARAN SINGH UNIVERSITY, CAMPUS, MEERUT
M.SC. (MATHEMATICS) SYLLABI

(2018onwards for M. Sc. part-1, M. Phil., Pre-Ph.D. and 2019 onwards for M. Sc. part-2 also)

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			hrs/week	L: T: P	Max. marks
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2. M – 102	Real Analysis		6	6:0:0	100
3. M – 103	Differential Equations		6	6:0:0	100
4. M – 104	Metric Spaces		6	6:0:0	100
5. OE –105	Open Elective		4	4:0:0	100

M.Sc. Semester II

1. M 201	Topology		6	6:0:0	100
2. M - 202	Complex Analysis		6	6:0:0	100
3. M – 203	Advanced Discrete Mathematics		6	6:0:0	100
4. M – 204	Operations Research		6	6:0:0	100
5. OE–205	Open Elective	4	4:0:0		100

M.Sc. Semester III

2. M – 301	Measure and Integration		6	6:0:0	100
2. M – 302	Mechanics	6	6:0:0	100	
3. M – 303	Core- Elective (Any one of the following)				

(i)	Numerical Analysis	6	6:0:0	100	
(II)	Algebraic Coding Theory		6	6:0:0	100
(iii)	Linear Algebra		6	6:0:0	100
(IV)	Object Oriented Programming in C^{++}	6		4:0:2	100

4. M – 304	Core- Elective (Any one of the following)		6	6:0:0	100

- (I) Mathematical Methods
- (II) Mathematical Statistics
- (III) Partial Differential Equations   6   6:0:0   100
- (IV) Mathematical Programming

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5. OE   305   Open Elective4   4 :0:0   100

M.Sc. Semester IV

1. M – 401   Number Theory   6   6:0:0   100

2. M – 402   Fluid Dynamics   6   6:0:0   100

3. M –403   **Core- Elective (Any one of the following) 6**   6:0:0   100

    (I)   Functional Analysis
    (II)   Information Theory
    (III)   Mathematical Cryptography
    (IV)   Algebraic Topology

4. M– 404 **Core- Elective (Any one of the following)6**   6:0:0   100

    (I) Fuzzy Sets and its Applications
    (II) Differential Geomentry
    (III) Latice Theory
    (IV) File Structure and Database Management System

5. OE- 405   **Open Elective**   4   4:0:0   100

Courses/ Papers under CBCS Programme for the students of other departments who did not opted Mathematics in graduation

Open Elective- MA01(i)Basic Cryptography   4   4:0:0   100
                 (ii) Fundamentals Calculus

Open Elective- MA02   Optimization Techniques   4   4:0:0   100

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M.Phil. Semester-I

1. MP – 101   Research Methodology and Computer Applications
2. MP – 102 Optional course (Any one of the following)
   - (i) Topology
   - (ii) Fuzzy Sets and Systems
   - (iii) Continuum Mechanics
   - (iv) Non-linear Programming and Inventory Models

M.Phil. Semester-II

MP – 201 & 202 Optional Courses (Any two of the following)

- (i) Stability of Stratified and Rotating Flows
- (ii) Functional Analysis
- (iii) Finite Fields and Cryptography
- (iv) Bitopological Spaces
- (v) Approximation Theory
- (vi) Uniform Spaces
- (vii) Mathematical Theory of Reliability

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M. PHIL. MATHEMATICS
COURSE STRUCTURE & EVALUATION SCHEME

Sem.	Paper Code	Title of the Paper	Lectures hrs/week		Maximum Marks		
			L	P	IA	EA	Total
I	MP-101	Research Methodology & Computer Applications	6	-	20	80	100
	MP-102	Elective-(i)	6	-	20	80	100
	MP-201	Elective-(i)	6	-	20	80	100
	MP-202	Elective-(ii)	6	-	20	80	100
II		Project / Dissertation	Satisfactory / Unsatisfactory				
		GRAND TOTAL	400				

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Pre-Ph. D. Course Work Mathematics (Effective from 2018)

Pre-Ph. D. Course Work (Structure & Evaluation Scheme)

Sem.	Paper Code	Title of the Paper	No of lectures	Maximum Marks
one	H-049	Research Methodology & Computer Applications	60	100
	H-050	Advanced Mathematics	60	100
	H-549	(Term Paper) Review of literature(viva)		50
		GRAND TOTAL		250

(ANURAG SHARMA)

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Proceeding of the Meeting

Sub: Syllabus of Research Methodology and Computer Applications (Paper-1) for the Pre-Ph. D. Course work in Physical Sciences

Date: 21-06-2018

Venue: Department of Mathematics

Members Present:

Prof. Y. Vimala, Dean Science, Department of Botany, C.C.S. University, Meerut
Prof. M.K. Gupta, Department of Mathematics, C.C.S. University, Meerut
Prof. Hare Krishna, Department of Statistics, C.C.S. University, Meerut
Prof. R. K. Soni, Department of Chemistry, C.C.S. University, Meerut
Prof. Beer Pal, Department of Physics, C.C.S. University, Meerut
Prof. Jaimala (Convener), Department of Mathematics, C.C.S. University, Meerut

Agenda 1: To separate Physical Sciences from Life Sciences in the reference of paper-1: Research Methodology and Computer Applications of Pre-Ph. D. Course work.

Recommendation: It was recommended by the committee that due to some constraints regarding the different requirements of the two major constituents of the science faculty: Life Sciences and Physical Sciences, the paper-1: Research Methodology and Computer Applications of Pre-Ph. D. Course work, which was commonly constituted for the whole science faculty and was run accordingly should be framed and run separately for the Physical Sciences.

Agenda 2: Framing of the Syllabus of the paper-1: Research Methodology and Computer Applications of Pre-Ph. D. Course work.

Recommendation: The committee proposes/recommends the attached syllabus for the departments falling under physical sciences including the Chemistry Department. It also recommends that the syllabus will be adopted once it is approved by the Board of Studies of any of the concerned departments. Since the Board of Studies is to be held very shortly for Mathematics it will be presented there for approval. Successively it will be implemented from the session-2018, in anticipation of its final approval by the Academic Council.

Agenda 3: Where to run the course?

Recommendation: The Committee recommends that the course will be run either for all the departments of physical sciences by the constituent departments one by one in the alphabetical order or by more than one department again as per the alphabetical order or if required by all the departments individually. This year (i.e. in 2018) overall there are almost 52 students in physical sciences and the turn of running the course is of the Department of Mathematics, therefore the course will be run by the Department of Mathematics.

(Y. Vimala)   (Hare Krishna)   (R.K. Soni)   (Beer Pal Singh)   (Jaimala)

Enclosure: The Syllabus of Research Methodology and Computer Applications (Paper-1) for the Pre-Ph. D. Course work in Physical Sciences.

Submitted to the Hon'ble Vice-Chancellor for his kind perusal and approval.

CH. CHARAN SINGH UNIVERSITY, MEERUT

Ref.: Committee Cell (BOS-Maths)/3706
Dated: 05-07-2018

A meeting of the Combined Board of Studies (University Campus & Affiliated Colleges) in the subject of Mathematics will be held on 07-07-2018 at 11:00 A.M. in the Committee Room. Administrative Block, Choudhary Charan Singh University, Meerut. Members are requested to kindly find it convenient to attend the meeting please. Agenda of the meeting will be placed on table.

Members of Board of Studies in Mathematics:-

1. Prof. Y.Vimala, Dean Faculty of Science, C.C.S. University, Meerut.
2. Prof. Jai Mala, Deptt. of Maths, C.C.S. University, Meerut.
3. Prof. M.K. Gupta, Deptt. of Maths, C.C.S. University, Meerut.
4. Dr. Arun Kumar Gupta, Deptt. of Maths, Maharaj Singh College, Saharanpur.
5. Dr. Narottam Kumar, Deptt. of Maths, Meerut College, Meerut.
6. Dr. Anurag Sharma, Deptt. of Maths, D.N. College, Meerut.
7. Prof. Sunder Lal, Deptt. of Maths, Dr. B.R. Ambedkar University, Agra.
8. Prof. D. Pandey, (Retd.), Deptt. of Maths, C.C.S. University, Meerut.
9. Prof. R.C. Mittal, Deptt. of Maths, I.I.T. Roorkee, Roorkee.
10. Dr. V.K. Sharma, D.N.(PG) College Gulaoti, Bulandshahr (special Invitee)

Registrar

Copy to:-

1. S.V.C. for kind information of the Hob'ble Vice Chancellor.
2. P.A. to Pro. V.C. for kind information of the Pro. V.C.
3. Steno to the Finance Controller for information of the Finance Controller to make arrangement of payment of TA/DA of participant and to expedite the bills of refreshment will be submitted by the concerned
4. H.O.D. concerned/committee cell to make arrangement of refreshment e.t.c. to the members.

Registrar

PROCEEDING OF THE MEETING OF BOARD OF STUDIES OF MATHEMATICS

Subject: To revise the syllabi of M. Sc. (Campus), M. Phil. and Pre-Ph. D. course work

Date: 07-07-2018

Venue: Committee Hall, C. C. S. University, Meerut

Board of Studies

Dean Science: Dr. Y. Vimala, Prof. & Head, Department of Botany, C.C.S. University, Meerut

University Professor: Dr. Mridul Gupta, Department of Mathematics

Colleges' Representatives: Dr. Arun Kumar Gupta, M.S. College, Saharanpur

Dr. Narottam Kumar, Meerut College, Meerut

Dr. Anurag Sharma, D.N. College, Meerut

External Experts: Dr. Sunder Lal, Professor (Retd.), B.R. Ambedkar University, Agra

Dr. D. Pandey, Professor (Retd.), C.C.S. University, Meerut

Dr. R.C. Mittal, Professor, I.I.T. Roorkee

Convener: Dr. Jaimala, Prof. & Head, Dept. of Mathematics, C.C.S. University, Meerut

Agenda 1: To finalize/approve the syllabus of Pre-Ph.D. Course Work,
Paper-1: (H-049) Research Methodology and Computer Applications
for subjects lying under Physical Sciences including Chemistry

Discussion: The common syllabus of Pre-Ph.D. Course Work, Paper-1: Research Methodology and Computer Applications, framed by the concerned departments belonging to the Physical Sciences under the guidance of the Dean, Science and approved by the Hon'ble Vice-Chancellor was put before the committee for discussion.

Action/ Recommendation: The syllabus is approved unanimously for the departments lying under the physical sciences.

Agenda 2: Reformation of the syllabus of Pre-Ph.D. Course Work,
Paper-2: (H-050) Advanced Mathematics.

Discussion/Action/ Recommandation: The existing syllabus contains five units on different topics of mathematics. After discussion some units are replaced and their syllabus is finalized.

Agenda 3: To plan/ reframe the papers and their syllabi for M.Phil. Mathematics.

Discussion/Action/ Recommendation: The existing papers taught in M.Phil. Mathematics and their syllabi were discussed. The existing papers and their semester schedule is as follows:

M.Phil. Semester-I:
  (i) MP 101 Research Methodology and Computer Applications (Compulsory)
  (ii) MP 102 Topology (Compulsory)

M.Phil. Semester-II: (MP 201 & 202) Optional Courses: Any two of the following:
  (i) Stability of Stratified and Rotating Flows
  (ii) Functional Analysis
  (iii) Continuum Mechanics
  (iv) Bitopological Spaces

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(v) Approximation Theory

(vi) Uniform Spaces

(vii) Magneto Hydrodynamics

(viii) Mathematical Cryptography

(ix) Fuzzy Sets and System

(x) Advanced Operations Research

After discussion the following changes are recommended:

- In Semester-1, in place of two compulsory papers, paper-1: Research Methodology and Computer Applications will be the compulsory paper while Paper- 2 will be optional. In this semester more than one optional may be run as per the situation. In Semester-2 student has to opt two papers out of seven papers. More than two optional may be run as per the situation. The **new schedule** will be as follows:

M.Phil. Semester-I

1. **MP – 101** Research Methodology and Computer Applications (Compulsory)
2. **MP – 102 Optional course (Any one of the following)**
   (i) Topology
   (ii) Fuzzy Sets and Systems
   (iii) Continuum Mechanics
   (iv) Non-linear programming and Inventory Models

M.Phil. Semester-II

MP – 201 & 202 Optional Courses (Any two of the following)

(i) Stability of Stratified and Rotating Flows
(ii) Functional Analysis
(iii) Finite Field and Cryptography
(iv) Bitopological Spaces
(v) Approximation Theory
(vi) Uniform Spaces
(vii) Mathematical Theory & Reliability

- The syllabi of Research Methodology and Computer Applications, Continuum Mechanics and Stability of Stratified and Rotating Flows are reframed and the syllabi of newly introduced papers: Finite Field and Cryptography, Fuzzy Sets and Systems Mathematical theory of Reliability. Advanced Operation Research is replaced by Non-linear programming and inventory models.

Agenda 4: Courses and syllabus of M. Sc. Mathematics running in Campus under CBCS

Discussion/ Recommendations: The existing papers taught in M. Sc. Mathematics and their syllabi are discussed.

- The **papers are rescheduled** as:

M.Sc. Semester I

2

1. M – 101   AbstractAlgebra
2. M – 102   Real Analysis
3. M – 103   Differential Equations
4. M – 104   Metric Spaces
5. OE –105   Open Elective

M.Sc. Semester II

1. M – 201   Topology
2. M – 202   Complex Analysis
3. M – 203   Advanced Discrete Mathematics
4. M – 204   Operations Research
5. OE–205   **Open Elective**

M.Sc. Semester III

1. M – 301   Measure and Integration
2. M – 302   Mechanics

3. M – 303   **Core- Elective-1** (Any one of the following)
   (I)   Numerical Analysis
   (II)   Algebraic Coding Theory
   (III)   Linear Algebra
   (IV)   Object Oriented Programming in C^{++}

4. M – 304 **Core- Elective-2** (Any one of the following)
   (I) Mathematical Methods
   (II) Mathematical Statistics
   (III)   Partial Differential Equations
   (IV)   Mathematical Programming

5. OE – 305 **Open Elective**

M.Sc. Semester IV

1. M – 401   Number Theory
2. M – 402   Fluid Dynamics

3. M –403   **Core- Elective-1 (Any one of the following)**
   (I)   Functional Analysis
   (II)   Information Theory
   (III)   Mathematical Cryptography
   (IV)   Algebraic Topology

4.M   404 **Core- Elective-2 (Any one of the following)**
   (I) Fuzzy Sets and its Applications
   (II) Differential Geomentry
   (III) Latice Theory
   (IV) File Structure and Database Management System
5. OE– 405   **Open Elective**

- The syllabi of Abstract Algebra, Differential Equations, Metric Space, Operations Research, Mathematical Methods, Numerical Analysis, Mathematical Statistics, Mechanics, Fluid Dynamics and Fuzzy Sets and Systems **are reframed**. The paper of Plasma Dynamics is deleted.

Agenda 5:(i) Under CBCS programme, for Students of other Departments, the courses offered by Mathematics department will be opted by the students who have not opted Mathematics as main subject in Graduation.

(ii) In third semester, under CBCS system in place of existing one open elective (M-A01): Basic Cryptography, there may be two options out of which only one open elective will be taught as per the need of time.

- **Discussion/ Recommendations:**Committee agrees that the papers under CBCS system will be offered only to those students who did not opt maths as a main subject in their graduation.

Committee agreeson point (ii) of Agenda 5 that in third semester, under CBCS system,for the students of other departments,there may be two open electives. A new paper 'Fundamentals Calculus has been introduced for the same and its syllabus is framed. Therefore, the papers for open elective will be

Courses/ Papers under CBCS Programme for Students of other Departments

Sem-II: Open Elective- (M-A02) Optimization Techniques
Sem-III: Open Elective- (M-A01) (any one)
   (i)Basic Cryptography
 (ii) Fundamentals Calculus

Agenda 6: Pre-Ph.D. coursework for the applicants of Computer Science registered in Mathematics.
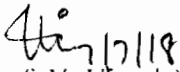
Discussion/ Recommendations: After discussion on the issue BOS members are of the view that syllabus wise neither of the two papers: paper-1 and paper-2 of Pre Ph.D. course work for mathematics are suitable for them. Both of the papers are required to be reframed for Computer Science applicants.

Note:

- The above recommendations will be applicable for M.Sc. first year, M.Phil. and Pre-Ph.D. course work from 2018 while for this year (2018) old schedule and syllabus will be followed for M.Sc. second year students. However, from 2019 it will be applicable for all.
- The syllabus of paper-1 of Research Methodology and Computer Applications framed for the departments belonging to the physical sciences for Pre-Ph.D. course work may independently be adopted by the department of Mathematics for the course work of Pre-Ph. D.
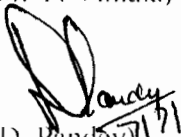
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Submitted to Hon'ble Vice-Chancellor for his kind perusal and approval

(Prof. Y. Vimala)   (Prof. Sunder Lal)   (Prof. R. C. Mittal) 7-7-18

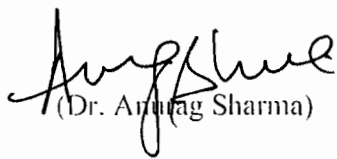(Prof. D. Pandey) 7/11/8'   (Prof. Mridul K. Gupta)   (Dr. Arun Kumar) 7/7/18

(Dr. Narottam Kumar)   (Dr. Anurag Sharma)   (Jaimala)

Approved

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