#### यशवंतराव चव्हाण महाराष्ट्र मुक्त विद्यापीठ, नाशिक



#### Yashwantrao Chavan Maharashtra Open University, Nashik

#### **NAAC Accredited 'A' Grade**

ज्ञानगंगोत्री, गंगापूर धरणाजवळ, गोवर्धन नाशिक – ४२२ २२२ (महाराष्ट्र) भारत

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विज्ञान विद्याशाखा / School of Sciences

### 4Y B.Sc. (Honours) (Major in Mathematics) (2025 Pattern) Programme

### Minutes of the PAC Meeting held on 06.06.2024

Date: 6<sup>th</sup> June, 2024 Time: 10.30 am to 04.30 pm

The PAC Meeting for 4Y B.Sc. (Honours) (Major in Mathematics) (2025 Pattern) Programme as per NEP 2020 of **School of Sciences** was held offline & online on **Thusday, 06-06-2024 at 10:30 AM** at school meeting hall. Following members and invitees were present in person,

01	Dr. Chetana Kamlaskar	(Chairperson) and Member
02	Dr. J. N. Chaudhari	Member
03	Dr. V. R. Nikam	Member
04	Dr. Bhausaheb S. Desale	Member
05	Dr. S. R. Chaudhari	Invitee
06	Ms. Tejaswi Kadam	Academic Coordinator (Mathematics
		Programme) and Invitee
07	Dr. Bharat More	Invitee
08	Dr. Jagruti Chavan	Invitee
09	Mr. Nandkishor Sangale	Invitee
10	Ms. Minakshi Kadel	Invitee
11	Dr. Dnyaneshwar Bhusanur	Invitee
12	Mr. Ravindra Bharsat	Invitee

Following members could not attend the meeting due to their other engagements.

01	Dr. Sunanda More	Member

Dr. Chetana Kamlaskar, Chairperson and Member of the PAC first welcomed PAC members and introduced the members about the purpose of the meeting. During the meeting following items were discussed.

### **SN** Details of Items

Agenda 1: To finalize and approve proposed BSc (Honours) (Major in Mathematics) programme - credit distribution details, second and third year (semester 03 to 06) detailed syllabus related to Major, Minor courses of Mathematics, and their evaluation pattern for all first, second and third year courses at

semester 01 to 06

#### Resolution

The PAC members unanimously finalised and approved the proposed programme structure, credit distribution details for all second- and third-year courses at semester 03 to 06, detailed syllabus related to Major, Minor courses of Mathematics, and evaluation pattern for all first, second- and third-year courses at semester 01 to 06 of the following 02 programmes as per NEP2020 guidelines, with few suggestions about courses in programme structure:

- i) 4 Year B.Sc. (Honours) (Major in Mathematics and Minor in Physics)
- ii) 4 Year B.Sc. (Honours) (Major in Mathematics and Minor in Chemistry)

#### **Suggestions by PAC members:**

- 1. Suggestions related to Major in Mathematics programme courses in proposed programme structure of 'B.Sc. (Honours) {2025 Pattern}':
  - For the First year (Semester 01 and 02):

Sem & Course	Suggestion		
name			
Sem01: Algebra	Rename course	title	as
	'Fundamentals		of
	Mathematics'		

• For the Second year (Semester 03 and 04):

- 1 of the Beeof	id year (Semester 03 and 04).
Sem & Course	Suggestion
name	
Sem04: Group	Replace with the course
Theory	'Numerical Methods'
Sem05:Complex	Replace with the course
Analysis	'Differential Equations'
Sem05:	Replace with Mathematics
Ordinary	related <b>IKS</b> course.
Differential	
Equations	
Sem05:	Replace with practical
Introduction to	course 'Programming in
Programming	MATLAB'.
for mathematics:	
[Scilab, C,	
Python, LaTex]	
Sem06: Partial	Replace with the course

Differential	'Group Theory' which is
Equations	removed from earlier sem.

The selection of (Major) Mandatory courses in the programme structure has been finalized with very serious discussion and fruitful deliberations among all PAC members.

2. Suggestions related to Syllabus of Major courses of Mathematics in the finalized programme structure of 'B.Sc. (Honours) {2025 Pattern}':

After careful consideration of the syllabi of the finalized courses, it has been observed that the proposed syllabus is extensive and presents a higher level of difficulty compared to those of other traditional universities.

As part of the discussions, it has been suggested to restructure the course content for certain courses to ensure a logical flow.

Following extensive deliberations among all PAC members and considering the aforementioned suggestions, it has been decided to conduct a thorough review of the syllabi for the proposed courses in collaboration with the respective proposed Self-Learning Material (SLM) writers. Additionally, it has been agreed to finalize the syllabi for the newly proposed courses in due

Now, updated syllabi received from PAC members are attached with this minutes.

3. Suggestions related to Mathematics as Minor courses in proposed programme structure of 'B.Sc. (Honours) {2025 Pattern}':

In the proposed programme structure, major Mathematics courses that can be advantageous for students majoring in disciplines other than Mathematics, such as Chemistry or Physics, are being recommended as minor Mathematics courses for these students.

Therefore, any modifications proposed for major classes will also be applicable to the corresponding courses offered as minors.

**Action Taken:** Programme structure and syllabus has been updated as per the discussion in PAC meeting.

course of time.

Refer **Appendix I & II** for updated programme structure & syllabus.

	Agenda 2: Finalization and approval of Syllabus of Elective courses (DSE), OE/VSC courses etc related to Mathematics	1. The PAC members unanimously finalized and approved the syllabus of the proposed electives courses (DSE) in Mathematics with few suggestions, which were retained after the finalization of the programme structure:
		Sem05: Replace with the course Numerical 'Lattice and Graph Theory'
		<ol> <li>Related to OE courses: It has been resolved to modify the proposed Mathematics OE courses. The focus will now be on fostering fundamental level conceptual understanding and offering application-oriented courses tailored for students outside the Science Faculty.</li> <li>Therefore, OE/VSC courses related to Mathematics have been discussed and some</li> </ol>
		courses are suggested which will be open for all faculties, as per NEP 2020 guidelines. The detail discussion regarding OE/VSC will be finalised in next PAC meeting.
		<ul> <li>The PAC members Suggested OE course title are given below: -         <ol> <li>Fundamental Mathematics</li> <li>Quantitative Aptitude</li> <li>Logical Reasoning</li> </ol> </li> </ul>
	Action Taken: Syllabus has been up Refer Appendix II for updated syllab	dated as per the discussion in PAC meeting.
3	Agenda 3: Framing guidelines for OJT/FP and RP Courses	regarding the OJT/FP and RP courses. A booklet of OJT/FP will be proposed by School of Sciences for all UG courses, which will be finalized in due course of time.  It was also resolved to authorize the Director of this School to enrich and update the OJT, Field Project (FP), and Research Project (RP) guidelines from time to time as per the University Policy decisions/norms.
4	Agenda 4: Identification of Writers/ Editors for SLM development task	The PAC members unanimously gave their consent for the writing/editing of the Self Learning Material (SLM) for the proposed B.Sc. (Honours) (Major in Mathematics) programme. For a few courses, the PAC members have given their consent for SLM development. They also

agreed to recommend experts for the new
courses, in due course of time.
It was also resolved to authorize the Director of
this School to enrich and update the list of
writers/editors for the Self Learning Material
(SLM) development task from time to time as per
the University Policy decisions/norms.

Meeting ends with vote of thanks by Minakshi Kadel.

Thank You

(Dr. Chetana Kamlaskar)

Chairperson, PAC B.Sc. (Honours)

(Major in Mathematics)

# Credit Distribution:

# Mathematics: Major, Minor, OE, VSC and IKS Courses

Level	Sem	Major			Minor		OE		VSC, SEC (VSEC)		AEC, VEC,	IKS	OJT, FP, CE	Cum. Cr./		
Lever	Sem	Mandatory		Electives	WIIIOI		OE				1120, 120,	1110		CC, RP		Sem
		MAT101: Fundamentals of Mathematics (T)	4				OE101 :Fundamental Mathematics (T)	2	VSC101: Basic Instrumentation Skills (TW)	2	AEC101: Engl Communication-	_		2		
	I	MAT102: Mathematical	2	-	-		OE102: Fundamental	2	SEC101: IT &	2	VEC101: Value Ed (T)		ion	CC101: Yoga(TW)	2	22
4.5		Statistics using MS Excel(P)					Mathematics (P)		e-Learning Skills <b>(TW)</b>		IKS101: Ved Mathematics (	-	2	2		
	MAT103: Calculus (T) 4  MAT104: Prestical Recod		4	_	MAT101: Fundamentals		<b>OE103:</b> Quantitative Aptitude <b>(T)</b>	2	MAT102: Mathematical Statistics using MS Excel(P)	2	AEC102: Engl Communication-		) 2	CC102: Drawing &	2	22
	MAT104: Practical Based on MAT103 (P)		2		of Mathematics (T)		<b>OE104:</b> Quantitative Aptitude <b>(P)</b>	2	SEC102: Solar Panel System (TW)	2	VEC102: Environ Science (T)		tal	Sketching (TW)	1	1
Cum	Cum. Cr. 12		00	02		08		08		10			04		44	
		MAT201: Linear Algebra (T	(1)	4									H	ield Project	2	
	III	MAT202: Calculus of Sever Variables (T)	al	2 -	MAT103: Calculus (T)		OE 201: Logical Reasoning (T)	2	MAT104: Practical Based on MAT103 (P)	2	<b>AEC201:</b> Modern Indian Language- 1	2				22
5.0		MAT203: Practical Based o MAT201 & MAT202(P)	n	2	Carcaras (1)				based on MATIO3 (1)		(T)			<b>201:</b> Conference & Event nagement(TW)	2	
		MAT 204: Real Analysis (T	)	4										СЕР	2	
	IV	MAT 205: Numerical Methods(T)		2 -	MAT201: Linear Algebra (T)	•	4 Code: IPR(T)	2		2	<b>AEC202:</b> Modern Indian Language- 2	2	CC2	o2: Personality		22
		MAT206: Practical Based o MAT204 & MAT205 (P)	n	2	111300111 (1)				(TW)		(T)		& Ca	reer Skills <b>(TW)</b>	2	
	. Cr.	28	-		10		T '	-	· L						-	88

T 1	G	Мајо	r			Minor			E	VSC, SEC		AEC,		OJT, FP, CI	EP,	Cum.	
Level	Sem	Mandatory		Electives		WIIIIOF			E	(VSEC)		VEC, IKS		CC, RP		Cr. / Sem	
		MAT301: Differential Equations (T)	4	MAT304:Lattice and Graph Theory (T)						VSC301:							
	v	MAT302: IKS (T)	2	OR 2	4	MAT301: Differential Equations (T)	4	-	-	MAT303: Programming	2	-	-	FP/CEP	2	22	
5.5		MAT303:Programming in MATLAB (P)	4	MAT305: Analytical Geometry (T)		-				in MATLAB <b>(P)</b>							
		MAT306: Metric Spaces (T)	4	MAT309:LPP and Game Theory(T)													
	VI	MAT307: Group Theory (T)			4	MATXXX: Numerical Analysis (T)		1	-	-		-	-	-	OJT	4	22
		MAT 308: Mathematical Modelling(P)	4	MA1310.Financiai Mathematics(1)													
Cum	. Cr.	48		08		18		1	2	14		14		18		132	

Level	Sem	Major				Minor		OE	VSC, SI		AEC,		OJT, FP,		Cum. Cr./
		Mandatory		Electives			(VSEC	()	VEC, IKS		CEP,CC, RP		Sem		
		MAT401: Real Analysis (T)	4	MAT406: Operations Research (T)		RES405:									
	VII	MAT402:Abstract Algebra (T)	4	OR	4	Research	4	-	_		_		_	2	22
		MAT403: Ordinary Differential Equations (T)	2	MAT407: Numerical Analysis (T)	•	Methodology <b>(T)</b>									
		MAT404:Programming in C and Scilab (P)	4	(1)		(-)									
6.0		MAT409: Topology (T)	4												
	VIII	MAT410: Linear Algebra (T)	4	MAT415: Number Theory (T) OR									<b>MAT413:</b> OJT		22
	VIII	MAT411: Partial Differential Equations (T)	2	MAT416: Field Theory (T)	4	-							001	4	22
		MAT412:LaTeX and Programming in SageMath(P)	4												
Cun	ı. Cr.	76		16		22		12	14		14		22		176

## Programme Structure: 4 Year B.Sc. (Honours) (Major in Mathematics and Minor in Physics)

PHY 304:

Optics

**(T)** 

Level	Sem	Major			Minor		OE		AEC VEC I	IIZC		OJT, FP, CE	Ρ,	Cun Cr.		
Levei	Sem	Mandatory		Elective	es		OE.		VSC, SEC (VSEC)	VSC, SEC (VSEC)			AEC, VEC, IKS			
		MAT101: Fundamentals of Mathematics (T)	4					2	VSC101: Basic Instrumentation Skills (TW)	2	AEC101: Englis Communication-1		2			
	I	MAT102: Mathematical	2	-	-			2	SEC101: IT &	2	VEC101: Value Education (T)		2	<b>CC101:</b> Yoga <b>(TW)</b>	2	22
4.5		Statistics using MS Excel(P)						_	e-Learning Skills <b>(TW)</b>		IKS101: Vedic Mathematics (7	-	2			
	II	MAT103: Calculus (T)	4		PHY103: Electricity & 2			2	VSC102: Lab Activities on PHY103 (P)	2	AEC102: English Communication-2		2	<b>CC102:</b> Drawing &	2	22
		MAT104: Practical Based on MAT103 (P)  Magnetic (T)	Magnetism				SEC102: Solar Panel System (TW)	2	VEC102: Environmental Sci (T)	ience	2	Sketching (TW)	2	22		
Cum	. Cr.	12		00	02		08	•	08	•	10		•	04		44
I	Exit opti	on: Award of UG Certificate	in M	ATHEM	ATICS as Major with	44 c	redits <mark>and</mark> an addi	tiona	l 4 credits core NSQF cou	urse	/ Internship <mark>OR</mark> Co	ontii	nue w	ith Major and	Mino	or
		MAT201: Linear Algebra ('	Г)	4	PHY201:								Fi	ield Project	2	
5.0	III	MAT202: Calculus of Seve Variables (T)	ral	2 -	Thermodynamics & Statistical	4		2			AEC201: Modern Indian Language- 1	2				22
		<b>MAT203:</b> Practical Based of MAT201 & MAT202 <b>(P)</b>	on	2	Mechanics (T)				(P)		(T)			& Event agement(TW)	2	

MAT204 & MAT205 (P)

Cum. Cr. 28

00

10

12

12

12

14

12

88

Exit option: Award of UG Diploma in MATHEMATICS as Major and PHYSICS as Minor with 88 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major

and Minor

2

Code: IPR(T)

MAT 205: Numerical Methods(T)

MAT206: Practical Based on

AEC202:Modern

Indian Language- 2

**(T)** 

22

**CC202:** Personality

& Career Skills (TW)

SEC201: Financial &

**Investment Skills** 

(TW)

Lovel	Com	Majo	Major							VSC, SEC		AEC, VEC,		OJT, FP, CEP,		Cum.
Level	Sem	Mandatory		Electives		Minor		<b>O</b> 1	Ľ	(VSEC)		IKS		CC, RP		Cr. / Sem
		MAT301: Differential Equations (T)	4	MAT304:Lattice and Graph Theory (T)		PHY301:Classical				VCCo o v I al						
	$\mathbf{v}$	MAT302: IKS (T)	2	OR	4		4	-	-	VSC301:Lab Activities on	2	-	-	FP/CEP	2	22
5.5		MAT303:Programming in MATLAB (P)	4	MAT305: Analytical Geometry (T)						PHY301 <b>(P)</b>						
		MAT306: Metric Spaces (T)	4	MAT309:LPP and Game Theory(T)		PHY307:Nuclear										
	VI	MAT307: Group Theory (T)	2	OR	OR 4 Ph		4	-	-	-		-	-	OJT	4	22
		MAT 308: Mathematical Modelling(P)	4	AT310:Financial Mathematics(T)		Safety <b>(T)</b>										
Cum.	. Cr.	48		08		18		12	2	14		14		18		132

Exit option: Award of UG Degree in MATHEMATCS as Major with 132 credits OR Continue with Major and Minor

Level	Sem	Major	Minor	OE	VSC, SE		OJT, FP,		Cum. Cr./			
20102		Mandatory		Electives		02	(VSEC)	VEC, IKS	CEP,CC, RP		Sem	
	VIII	MAT401: Real Analysis (T)	4	MAT406: Operations Research (T) OR MAT407: Numerical Analysis (T)		RES405:						
		MAT402:Abstract Algebra (T)	4		4	Research 4	-	_	_	-	2	22
		MAT403: Ordinary Differential Equations (T)	2		1	Methodology <b>(T)</b>						
		MAT404:Programming in C and Scilab (P)	4	(1)		(-)						
6.0		MAT409: Topology (T)	4									
		MAT410: Linear Algebra (T)	4	MAT415: Number Theory (T) OR MAT416: Field Theory (T)	4	_				<b>MAT413:</b> OJT	4	22
		MAT411: Partial Differential Equations (T)	2		4	-				001	4	
		MAT412:LaTeX and Programming in SageMath(P)	4									
Cum	. Cr.	76		16		22	12	14	14	22		176

Four Year UG Honours Degree in MATHEMATICS as Major and PHYSICS as Minor with 176 credits

# Programme Structure: 4 Year B.Sc. (Honours) (Major in Mathematics and Minor in Chemistry)

Level	Sem	Major Floativo				Minor		OE		VSC, SEC (VSEC	AEC, VEC,	IKS		OJT, FP, CEP, CC, RP		Cum. Cr./	
		Mandatory	Electives							-, -,	-, -, -,				Sem		
4.5		MAT101: Fundamentals of Mathematics (T)	4						2	VSC101: Basic Instrumentation Skills (TW)	3	AEC101: Engl Communication-		2			
	I	MAT102: Mathematical Statistics using MS Excel(P)		-		-				SEC101: IT &		VEC101: Val Education (1	<b>(</b> )	2	CC101: Yoga(TW)	2	22
										e-Learning Skills <b>(TW)</b>		IKS101: Ved Mathematics (	-	2			
	ш	MAT103: Calculus (T)	4	_		CHE103: Physical & Organic				VSC102: Physical & Organic Chemistry-I (P)		9	AEC102: English mmunication-2 (T)		CC102: Drawing &	2	22
	11	MAT104: Practical Based on MAT103 (P)	2			Chemistry-I (T)				SEC102: Solar Panel System (TW)		VEC102: Environmental Se (T)	e <b>2</b>	Sketching (TW)		22	
Cum	Cum. Cr. 12			00						08	10	10				44	
E	Exit opti	ion: Award of UG Certificate	in M	ATHEM.	AT	ICS as Major with	44 (	credits <mark>and</mark> an addit	iona	l 4 credits core NSQF c	cours	e/ Internship <mark>OR</mark> (	Conti	inue w	vith Major and I	Minc	r
	Ш	MAT201: Linear Algebra (T MAT202: Calculus of Severa Variables (T)		4		CHE201: Physical & Organic			2	VSC201: Physical & Organic Chemistry-II	2	<b>AEC201:</b> Modern Indian Language- 1	2	F	ield Project	2	22
5.0		MAT203: Practical Based on MAT201 & MAT202(P)	n	2		Chemistry-II (T)				(P)		(T)			& Event nagement(TW)	2	
		MAT 204: Real Analysis (T)	)	4											CEP	2	
	IV	MAT 205: Numerical Methods	(T)	2 -		CHE204: Basic Analytical	4	Code: IPR(T)	2	SEC201: Financial & Investment Skills		AEC202:Modern Indian Language- 2	2		o2: Personality	2	22
		MAT206: Practical Based or MAT204 & MAT205 (P)	n	2		Chemistry (T)				(TW)		(T)		& Ca	reer Skills <b>(TW)</b>		
Cum	. Cr.	28		00	)	10		12		12	12	88					
Exit	option:	Award of UG Diploma in MA	THE	MATICS	S as	<b>Major and CHEM</b>	IST	RY as Minor with 8 Major and Min		dits <mark>and</mark> an additional	4 cr	edits core NSQF co	urse	/ Inte	rnship <mark>OR</mark> Cont	inue	with

Level	Sem	Maj	Minor		O	7	VSC, SEC (VSEC)		AEC, VEC, IKS		OJT, FP, CEP, CC, RP		Cum. Cr./			
Level	Sem	Mandatory	Electives		willor								2	Sem		
		MAT301: Differential Equations (T)	4	MAT304:Lattice and Graph Theory (T) OR	4					VSC301: Physical &			-			
5.5	$\mathbf{v}$	MAT302: IKS (T)	2			CHE206: Physical & Inorganic	4	4 _	-	Inorganic Chemistry	2	-		FP/CEP	2	22
		MAT303:Programming in MATLAB (P)	4	MAT305: Analytical Geometry (T)		Chemistry(T)				(P)						
		MAT306: Metric Spaces (T)	4	MAT309:LPP and Game Theory(T)  OR  MAT309:Financial Mathematics(T)	4		4	_	-	-						
	VI	MAT307: Group Theory (T)	2			CHE306: Green Chemistry (T)						-	-	OJT	4	22
		MAT 308: Mathematical Modelling(P)	4	MAT310: Financial Mathematics (T)												
Cum. Cr.		48		08		18		12		14		14		18		132
	<u>'</u>	Evit antion, Aryand of	IIO D	Dograp in MATHEMATCS of Major		th too anadita OD Cor			+L N	Taian and Min	~	•				

Exit option: Award of UG Degree in MATHEMATCS as Major with 132 credits OR Continue with Major and Minor

Level	Sem	Major	Minor	OE	VSC, SEC		AEC,		OJT, FP,		Cum. Cr./				
		Mandatory		Electives			(VSEC)		VEC, IKS		CEP,CC, RP		Sem		
	VII	MAT401: Real Analysis (T)	4	MAT406: Operations Research (T) OR MAT407: Numerical Analysis (T)		RES405:	4								
		MAT402:Abstract Algebra (T)	4		4	Research		_	-		_		-	2	22
		MAT403: Ordinary Differential Equations (T)	2			Methodology <b>(T)</b>									
		MAT404:Programming in C and Scilab (P)	4			(-)									
6.0		MAT409: Topology (T)	4												
	VIII	MAT410: Linear Algebra (T)	4	MAT415: Number Theory (T) OR MAT416: Field Theory (T)	4	_							<b>MAT413:</b> OJT		22
	V 111	MAT411: Partial Differential Equations (T)	2		4	-							001	4	22
		MAT412:LaTeX and Programming in SageMath(P)	4												
Cum. Cr. 76		16		22		12	14		14		22		176		
		Four Voor UC Honour	a Dom	ree in MATHEMATICS of Me	<b>:</b> - <b>-</b> -	ad CHEMICTDY on	Minor		one dite						

Four Year UG Honours Degree in MATHEMATICS as Major and CHEMISTRY as Minor with 176 credits

### **APPENDIX II:**

SYLLABUS OF B.Sc. (HONOURS) (MATHEMATICS AS MAJOR)

Refer the syllabus file attached with this mail separately.

APPENDIX III: Syllabus of B.Sc. (Honours) (Mathematics as Minor)

Refer the syllabus file attached with this mail separately