

FACULTY OF SCIENCES

SYLLABUS

Master of Science (Mathematics) (FYIP)

(Semester: I -II)

(Under Credit Based Continuous Evaluation Grading System)
(CBCEGS)

Session: 2026-27



The Heritage Institution

KANYA MAHA VIDYALAYA JALANDHAR

(Autonomous)

Master of Science (Mathematics) (FYIP)

Session: 2026-27

Programme Specific Outcomes

Upon successful completion of this course, students will be able to:

PSO1: Acquire a strong foundation in core areas of mathematics such as Algebra, Real and Complex Analysis, Topology, Differential Equations, and Mathematical Modelling.

PSO2: Develop the ability to think logically and critically, formulate and solve complex mathematical problems using appropriate techniques and tools.

PSO3: Apply mathematical concepts in research-oriented activities, undertake projects, and contribute to the advancement of knowledge in mathematics and allied disciplines.

PSO4: Gain hands-on experience in using computational software such as Excel, Scilab, Python, and R for solving mathematical problems and analyzing data.

PSO5: Effectively communicate mathematical ideas, theories, and results through well-structured reports, presentations, and discussions suitable for academic and professional platforms.

PSO6: Demonstrate readiness for pursuing higher studies, qualifying competitive exams, and taking up careers in academics, research, data science, actuarial sciences, and the financial sector.

PSO7: Integrate modern and ancient mathematical knowledge with other disciplines such as physics, computer science, economics, geography, astronomy and engineering to solve interdisciplinary problems.

PSO8: To Demonstrate awareness of ethical issues, professional responsibilities, and the societal impact of mathematical modelling and data analysis.

PSO9: To Demonstrates continuous learning by regularly updating mathematical knowledge through emerging areas such as Artificial Intelligence (AI), Web Technologies, and Cryptography. Integrates modern mathematical applications and digital tools into teaching and research to remain aligned with evolving technological advancements.

PSO10: Develop the ability to work effectively both independently and as part of a team, taking initiative and leadership roles in collaborative mathematical projects and research work.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Scheme and Curriculum of Examinations of Five Year Integrated Programme
(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)
Master of Science (Mathematics) (FYIP)
Semester-I
Session- 2026-27

Master of Science (Mathematics) (FYIP) Semester-I										
Course Code	Course type	Course Title	Hours Per Week L-T-P	Credits L-T-P	Total Credits	Max. Marks				Examination Time in Hours
						Total	TH	P	CA	
FMAL-1421/ FMAL-1031/ FMAL-1431	C	¹ Punjabi (Compulsory)/ ² Basic Punjabi/ ³ Punjab History and Culture	2-0-0	2-0-0	2	50	35	-	15	3
FMAL - 1102	AEC	Communicative English-I	2-0-0	2-0-0	2	50	35	-	15	3
FMAL-1333	DSC	Calculus	4-1-0	4-1-0	5	100	70	-	30	3
FMAL - 1334	DSC	Theory of Equations	4-1-0	4-1-0	5	100	70	-	30	3
FMAM-1135	C	Programming Language - I	3-0-2	3-0-1	4	100	40	30	30	3+3
FMAP-1336	DSC	Calculus Laboratory	0-0-4	0-0-2	2	50	-	35	15	3
FMAL-1330	SEC	Statistical Analysis Using Spreadsheet	2-0-0	2-0-0	2	50	35	-	15	3
FMAP-1330	SEC	Statistical Analysis Using Laboratory	0-0-8	0-0-4	4	100	-	70	30	3
USEP-0001	SEC	Entrepreneurship Mindset Level-I	0-0-4	0-0-2	2	50	-	35	15	
VACF-1491	VAAC	*Foundation Course	2-0-0	2-0-0	2	50	35	-	15	1
Total					30					

C-Compulsory

AEC-Ability Enhancement Course

DSC-Discipline Specific Course

SEC-Skill Enhancement Course

VAAC-Value Added Audit Course

Note:

¹Domicile / Non Domicile of Punjab students who have studied Punjabi till 8th/ 10th class will study Punjabi (compulsory)

^{2,3}The Non-Domicile of Punjab Students who have not studied Punjabi till 8th/10th class can choose either Basic Punjabi or Punjab History and Culture (PHC)

²Domicile of Punjab students who studied out of Punjab and did not study Punjabi till 8th / 10th class will have to study Basic Punjabi

²Domicile of Punjab students who have studied in Kendriya Vidyalaya of Punjab or any other school and due to any reason did not study Punjabi till 8th/10th class will have to study Basic Punjabi

* Marks of this paper will not be added in total marks. Grades will be provided.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
 Scheme and Curriculum of Examinations of Five Year Integrated Programme
 (Under Credit Based Continuous Evaluation Grading System) (CBCEGS)
 Master of Science (Mathematics) (FYIP)
 Semester-II
 Session- 2026-27

Master of Science (Mathematics) (FYIP) Semester-II										
Course Code	Course Type	Course Title	Hours Per Week L-T-P	Credits L-T-P	Total Credits	Max. Marks				Examination Time in Hours
						Total	TH	P	CA	
FMAL-2421/ FMAL-2031/ FMAL-2431	C	¹ Punjabi (Compulsory)/ ² Basic Punjabi/ ³ Punjab History and Culture	2-0-0	2-0-0	2	50	35	-	15	3
FMAL-2102	AEC	Communicative English-II	2-0-0	2-0-0	2	50	35	-	15	3
FMAL-2333	DSC	Sequences and Series	4-1-0	4-1-0	5	100	70	-	30	3
FMAL - 2334	DSC	Algebra	4-1-0	4-1-0	5	100	70	-	30	3
FMAM-2135	C	Object Oriented Programming C++	3-0-2	3-0-1	4	100	40	30	30	3+3
FMAP-2336	DSC	Algebra Laboratory	0-0-4	0-0-2	2	50	-	35	15	3
FMAM-2330	SEC	Numerics Using SCILAB	3-0-2	3-0-1	4	100	40	30	30	3+3
USEP-0002	SEC	Entrepreneurship Mindset Level-II	0-0-4	0-0-2	2	50	-	35	15	
VACD-2161	VAC	Drug Abuse and Ethical Education	4-0-0	4-0-0	4	100	70	-	30	3
Total					30					

C-Compulsory

AEC-Ability Enhancement Course

DSC-Discipline Specific Course

SEC-Skill Enhancement Course

VAC-Value Added Course

Note:

¹Domicile / Non Domicile of Punjab students who have studied Punjabi till 8th/ 10th class will study Punjabi (compulsory)

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Master of Science (Mathematics)(FYIP)
Semester-I

Session- 2026-27

Course Title: Basic Punjabi

Course Code: FMAL-1031

Course Outcomes

CO1:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦਾ ਮੌਕਾ ਪ੍ਰਦਾਨਕਰਨਾ ਹੈ। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੈਂਤੀਅੱਖਰੀ, ਅੱਖਰਕ੍ਰਮ, ਪੈਰਬਿੰਦੀਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਮਾਤਰਾਵਾਂ (ਮੁੱਢਲੀਜਾਣਪਛਾਣ) ਲਗਾਮਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆਜਾਵੇਗਾ।

CO2:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀਸ਼ਬਦਬਣਤਰ ਦੀ ਮੁੱਢਲੀਜਾਣਪਛਾਣ (ਸਾਧਾਰਨਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ, ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ) ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆਜਾਵੇਗਾ।

CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਨਿੱਤਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਸ਼ਤੇਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰਧੰਦਿਆਂਆਦਿ ਨਾਲ ਸੰਬੰਧਤ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆਜਾਵੇਗਾ।

CO4:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀਵਿਚਹਫ਼ਤੇ ਦੇ ਸੱਤਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰ੍ਹਾਂਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਚੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕਤੋਂ ਸੌ ਤੱਕਗਿਣਤੀਸ਼ਬਦਾਂਵਿਚਸਿਖਾਉਣਾ ਹੈ।

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

L-T-P

Theory : 35

2-0-0

CA : 15

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ 1 ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ ਜ਼ਰੂਰ ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 7 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਪੈਂਤੀਅੱਖਰੀ, ਅੱਖਰਕ੍ਰਮ, ਪੈਰਬਿੰਦੀਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰਵਿਚਪੈਣਵਾਲੇ ਵਰਣ ਅਤੇ ਮਾਤ੍ਰਵਾਂ (ਮੁੱਢਲੀ ਜਾਣਪਛਾਣ) ਲਗਾਮਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ .

ਯੂਨਿਟ-II

ਪੰਜਾਬੀਸ਼ਬਦਬਣਤਰ : ਮੁੱਢਲੀਜਾਣਪਛਾਣ (ਸਾਧਾਰਨਸ਼ਬਦ, ਸੰਯੁਕਤਸ਼ਬਦ, ਮਿਸ਼ਰਤਸ਼ਬਦ, ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ)

ਯੂਨਿਟ-III

ਨਿੱਤਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਸ਼ਤੇਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰਧੰਦਿਆਂਆਦਿਨਾਲ ਸੰਬੰਧਤ।

ਯੂਨਿਟ-IV

ਹਫ਼ਤੇ ਦੇ ਸੱਤਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰਾਂਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕਤੋਂ ਸੌ ਤਕ ਗਿਣਤੀਸ਼ਬਦਾਂਵਿਚ ।

Master of Science (Mathematics)(FYIP)

Semester-I

Session- 2026-27

Course Title: Punjabi Compulsory

Course Code: FMAL-1421

Course Outcomes

CO1: ‘ਸਾਹਿਤ ਦੇ ਰੰਗ’ ਪੁਸਤਕ ਦੇ ਕਵਿਤਾਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਰਕ ਵਿਤਾਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ ਤਾਂਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚਲ ਰਹੀਆਂ ਕਾਵਿਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਲ ਕਰ ਸਕਣ। ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਕਵਿਤਾ ਦੀ ਵਿਆਖਿਆ, ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁਲਾਂਕਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ ਵੀ ਹੈ ਤਾਂਕਿ ਉਹ ਸਮਕਾਲੀ ਸਮਾਜ ਦੀਆਂ ਸਮੱਸਿਆਵਾਂ ਨੂੰ ਸਮਝ ਸਕਣ ਅਤੇ ਆਲੋਚਨਾਤਮਕ ਦ੍ਰਿਸ਼ਟੀ ਬਣਾ ਸਕਣ।

CO2: ‘ਸਾਹਿਤ ਦੇ ਰੰਗ’ ਪੁਸਤਕ ਦੇ ਕਹਾਣੀਭਾਗ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਦਰਕ ਕਹਾਣੀ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ ਅਤੇ ਕਹਾਣੀ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।

CO3: ਪੈਰਾ ਰਚਨਾ ਅਤੇ ਪੈਰਾਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO4 : ਧੁਨੀ ਵਿਉਂਤ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਧੁਨੀਆਂ ਦੀ ਉਚਾਰਨ ਪ੍ਰਣਾਲੀ ਤੋਂ ਵਾਕਫ਼ ਹੋਣਗੇ।

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50

L-T-P 2-0-0

Theory : 35

CA :15

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨਾਂ ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟਜ਼ ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 7 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੇ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾਮਹਿਲਸਿੰਘ), ਭਾਗਪਹਿਲਾ(ਕਵਿਤਾ),

ਰਵੀ ਸਾਹਿਤਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ, ਸਾਰ)

(ਡਾ.ਹਰਿਭਜਨਸਿੰਘ, ਪਾਸ਼, ਸੁਰਜੀਤਪਾਤਰ ਕਵੀ ਪਾਠਕ੍ਰਮਦਾਹਿੱਸਾਨਹੀਂਹਨ) 8 ਅੰਕ

ਯੂਨਿਟ-II

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾਮਹਿਲਸਿੰਘ), ਭਾਗਪਹਿਲਾ(ਕਹਾਣੀ),

ਰਵੀ ਸਾਹਿਤਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

(ਸਾਰ, ਵਿਸ਼ਾਵਸਤੂ)

(ਕੋਈ ਇੱਕ ਸਵਾਰ, ਘੋਟਣਾ, ਆਪਣਾ ਆਪਣਾ ਹਿੱਸਾ ਕਹਾਣੀ ਅੰਪਾਠਕ੍ਰਮਦਾਹਿੱਸਾਨਹੀਂਹਨ) 8 ਅੰਕ

ਯੂਨਿਟ-III

ਪੈਰਾਰਚਨਾ

ਪੈਰਾਪੜ੍ਹ ਕੇ ਪਸ਼ੂਨਾਂ ਦੇ ਉਤਰ। 8 ਅੰਕ

ਯੂਨਿਟ-IV

(ੳ) ਪੰਜਾਬੀ ਧੁਨੀਵਿਉਂਤ : ਪਰਿਭਾਸ਼ਾ ਤੇ ਉਚਾਰਨ ਅੰਗ

(ਅ) ਸਵਰ, ਵਿਅੰਜਨ 8 ਅੰਕ

Master of Science (Mathematics)(FYIP)
Semester-I

Session- 2026-27

Course Title: Punjab History and Culture (From Earliest Times to C 320)

Course Code: FMAL-1431

COURSE OUTCOMES

After completing Semester I and course on Punjab History and Culture students of History will be able to identify and have a complete grasp on the sources & writings of Ancient Indian History of Punjab.

CO1: Identify and understand the sources and physical features of Punjab

CO 2: To study the earliest civilisation (Indus Valley Civilization) and original home of Aryans

CO 3: To examine the Social, Religious and Economic life during Early and Later Vedic Age

CO 4: To comprehend the Buddhist, Jain and Hindu faith and their relevance in the modern times

Master of Science (Mathematics)(FYIP)

Semester-I

Session- 2026-27

Course Title: Punjab History and Culture (From Earliest Times to C 320)

Course Code: FMAL-1431

Examination Time: 3 Hours

Credits L-T-P: 2-0-0

Contact Hours: 2 Hrs/Week

Max. Marks: 50

Theory: 35

CA: 15

Instructions for the Paper Setter:

1. Question paper shall consist of four Units
2. Examiner shall set 8 questions in all by selecting Two Questions of equal marks from each Unit.
3. Candidates shall attempt 5 questions in 500 words, by at least selecting One Question from each Unit and the 5th question may be attempted from any of the four Units.
4. Each question will carry 7 marks

Unit I

1. Physical features of the Punjab
2. Sources of the ancient history of Punjab

Unit II

3. Harappan Civilization: social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home

Unit III

5. Social, Religious and Economic life during Early Vedic Age.
6. Social, Religious and Economic life during Later Vedic Age.

Unit IV

7. Teachings of Buddhism
8. Teachings of Jainism

Suggested Readings

- B.N. Sharma, Life in Northern India, Delhi. 1966.
- Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.
- Chopra, P.N., Puri, B.N., & Das, M.N. (1974). A Social, Cultural & Economic History of India, Vol. I, New Delhi: Macmillan India.
- L. M Joshi (ed.), History and Culture of the Punjab, Art-I, Patiala, 1989 (3rd edition)
- L.M. Joshi and Fauja Singh (ed.), History of Punjab, Vol.I, Patiala 1977.

Master of Science (Mathematics)(FYIP)

Semester-I

Session- 2026-27

Course Title: Communicative English-I

Course Code: FMAL-1102

Course Outcomes

The students will be:

CO 1: able to enhance their vocabulary through vocabulary building exercises

CO2: able to improve their writing skills by writing letters and reports

CO3: able to enhance their reading and analyzing power of texts through guided reading by the study of “Making Connections” by Kenneth J. Pakenham

CO4: acquainted to the techniques of effective essay writing

Master of Science (Mathematics)(FYIP)

Semester-I

Session- 2026-27

Course Title: Communicative English-I

Course Code: FMAL-1102

Examination Time: 3 Hours

Max.Marks: 50

Theory: 35

CA:15

L T P

2 0 0

Instructions for Paper Setters:

Eight questions of equal marks (07 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four).Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

“Word List”, “Correct Usage of Commonly used words and Phrases” from the chapter
“Vocabulary” given in The Written Word by Vandana R. Singh

Unit II

Letter- writing as prescribed in The Written Word by Vandana R. Singh
Report writing as prescribed in The Written Word by Vandana R. Singh

Unit III

Unit-I from Making Connections: A Strategic Approach to Academic Reading by
Kenneth J. Pakenham, Second Edition

Unit IV

Unit-II from Making Connections: A Strategic Approach to Academic Reading by
Kenneth J. Pakenham, Second Edition

Text Books:

The Written Word by Vandana R. Singh, Oxford University Press, New Delhi.
Making Connections: A Strategic Approach to Academic Reading by Kenneth J.Pakenham, Second
Edition

Master of Science (Mathematics)(FYIP)

Semester-I

Session- 2026-27

Course Title: Calculus

Course Code: FMAL-1333

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand real number system, limit of a function, basic properties of limit, continuity, and classification of discontinuities & to apply it in real world problem.

CO 2: To Classify the difference between increasing and decreasing functions and understand the concept of Differentiability of functions and maxima & minima.

CO 3: Demonstrate Asymptotes, points of inflexion, multiple points on a curve & also to differentiate between concavity and convexity.

CO 4: To understand the concepts of Riemann sum, definite integrals and their properties, the fundamental theorem of calculus, applications to length of arc and area bounded between curves, Reduction Formulae & to apply in a wide variety of disciplines like Bio, Eco, Physics & Engineering.

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Calculus

Course Code: FMAL-1333

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA:30

L T P

4 1 0

Instructions for Paper Setters:

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Review of limit and continuity of a function of real variable, indeterminate forms, higher order derivatives, Leibnitz theorem and applications to problems of the type

$$e^{ax} \sin(bx + c), e^{ax} \cos(bx + c), (a + bx)^n \sin x, (a + bx)^n \cos x.$$

Unit II

Differentiability of functions of real variable, increasing and decreasing functions, maxima and minima, Taylor's and Maclaurin's theorem with various forms of remainders.

Unit III

Concave upward, Concave downward, Point of inflexion, Asymptotes, Horizontal and Vertical Asymptotes, asymptotes of the algebraic curves represented by homogeneous equation in two variables.

Unit IV

Anti derivative of function of real variable, Riemann sums, definite integrals and their properties, the fundamental theorem of calculus, applications to length of arc and area bounded between Cartesian curves, Reduction Formulae, illustration of Reduction Formulae of type $\int \sin^n x \, dx$, $\int \cos^n x \, dx$, $\int \tan^n x \, dx$, $\int \sec^n x \, dx$, $\int \sin^n x \cos^m x \, dx$

Text Book:

Thomas, G.B., and Finney, L.R., Calculus and Analytic Geometry, 9th Edition, Addison Wesley, 1998, (Scope as in Ch.1-7, 9, 11).

Reference Books:

1. Apostol, T.M., Calculus, An Indian Adaptation, Wiley, 2022.
2. Anton, H., Bivens, I., and Davis, S., Calculus, 12th Ed. John Wiley and Sons (Asia)P. Ltd, Singapore, 2002. (Scope as in ch.0-3, 6, 10,12)
3. R. Courant and F. John. Introduction to Calculus and Analysis (Vol. 1), Springer, 1999. (Scope as in Ch.4)

Master of Science (Mathematics) (FYIP)

Semester-I

Session-2026-27

Course Title: Theory of Equations

Course Code: FMAL- 1334

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of Greatest Common Divisor, Unique Factorization of Polynomial over a field F

CO 2: To find the relations between the roots and coefficients of general equation in one variable, distinguish between solution of cubic equations and Bi-quadratic equations.

CO 3: Classify Symmetric functions, Solutions of reciprocal and binomial equations, and Algebraic solutions of the cubic and biquadratic Equations using Cardan's Method, Descarte's Method, Ferrari Method.

CO 4: Obtain homogeneous products, limits of the roots of equations and Separation of the roots of equations.

Master of Science (Mathematics) (FYIP)

Semester: I

Session: 2026-27

Course Title: Theory of Equations

Course Code: FMAL- 1334

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA: 30

L T P

4 1 0

Instructions for Paper Setters:

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

General properties of polynomials, Graphical representation of a polynomial, maximum and minimum values of a polynomials, Euclid's Algorithm, Greatest Common Divisor, Unique Factorization of Polynomial over a field F of numbers (Statement Only), Fundamental Theorem of Algebra (Statement only), Roots and their Multiplicity.

Unit II

General properties of equations, Relationship between the roots and the coefficients, Fundamental theorem of symmetric polynomials (without proof), Evaluation of symmetric functions of roots, Rational roots of polynomials with integral coefficients, Descarte's rule of signs positive and negative rule.

Unit III

Symmetric functions, Applications of symmetric function of the roots, Transformation of equations, Solutions of reciprocal and binomial equations, Algebraic solutions of the cubic and biquadratic Equations using Cardan's Method, Descarte's Method, Ferrari Method.

Unit IV

Symmetric functions of the roots, Newton's theorem on the sums of powers of roots, homogeneous products, limits of the roots of equations, Separation of the roots of equations

Text Books:

1. Burnside, W.S. and Panton, A.W., The Theory of Equations, Dublin University Press, 1954.
2. MacDuffee, C.C., Theory of Equations, John Wiley & Sons Inc., 1954.

Reference Book:

Kishan, H., Theory of Equations, Atlantic Publications, 2022.

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Statistical Analysis Using Spreadsheet

Course Code: FMAL -1335

Course Outcomes

After passing this course, the students will be able to:

CO:1 Understand the basic concepts and functions of Statistics, collect and present data using tabulation and charts (including Excel/SPSS), and compute measures of central tendency such as mean, median, mode, weighted mean, geometric mean, and harmonic mean.

CO:2 Analyze variability in data by calculating and interpreting measures of dispersion including range, quartile deviation, mean deviation, standard deviation, and coefficient of variation.

CO:3 Evaluate the shape of data distribution by computing and interpreting Karl Pearson's and Bowley's coefficients of skewness and understanding the concept of kurtosis.

CO:4 Examine relationships between variables by identifying types of correlation and applying Karl Pearson's coefficient of correlation and rank correlation methods.

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Statistical Analysis Using Spreadsheet

Course Code: FMAL -1335

Examination Time: 3 Hours

Max. Marks: 50

Theory: 35

CA: 15

L T P

2 0 0

Instructions for Paper Setters:

Eight questions of equal marks (7 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Introduction to statistics, functions of statistics, collection of data, presentation of data, tabulation of data, charting of data, introduction to excel/spss, graphs in excel, measures of central tendency-, mean, median - meaning and computation, mode- meaning and computation, weighted average mean, geometric mean and harmonic mean.

Unit II

Measures of dispersion, types of dispersion- range, quartile deviation, mean deviation, standard deviation, co-efficient of variation.

Unit III

Skewness- Karl Pearson co-efficient of skewness, Bowley's co-efficient of skewness and Kurtosis.

Unit IV

Correlation, Types of correlation, positive, negative, linear. methods of correlations - Karl Pearson's Co-efficient of correlation, rank correlation coefficient.

Reference Books:-

1. S.C. Gupta. Fundamentals of Mathematical Statistics, S. Chand Publication, 2000.
2. K. Berk, & P. Carey. Data Analysis with Microsoft Excel, Duxbury Press, 2000.

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Calculus Laboratory

Course Code: FMAP-1336

Course Outcomes

CO1: To Plot and analyze elementary function graphs and understand the effects of parameters a and b .

CO2: To Sketch and interpret polynomial functions of degree 4 and 5.

CO3: To Generate surfaces of revolution and sketch standard 3D quadric surfaces using Cartesian coordinates.

CO4: To Perform matrix operations and compute eigenvalues and eigenvectors.

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Calculus Laboratory

Course Code: FMAP-1336

Examination Time: 3 Hours

Max. Marks: 50

Practical: 35

CA:15

L T P

0 0 2

Practical (Using any Software)

1. Plotting the graphs of elementary functions: e^{ax+b} , $\sin(bx + c)$, $\log(ax + b)$, $1/(ax+b)$, $\sin(ax + b)$, $\cos(ax + b)$, $|ax + b|$ and to illustrate the effect of a and b on the graph.
2. Plotting the graphs of the polynomial of degree 4 and 5
3. Obtaining surfaces of revolution of curves and their area.
4. Sketching ellipsoid, hyperboloid of one and two sheets, elliptic cone, elliptic paraboloid, hyperbolic paraboloid using Cartesian coordinates.
5. Matrix operations (addition, multiplication, inverse, transpose), eigenvalues and eigenvectors.

Text Book:

Thomas, G.B. and Finney, R.L., Calculus and Analytic Geometry, 9th Edition, Addison Wesley, 1998. (Scope as in Ch.1-7,9,11)

Reference Books:

1. Anton, H., Bivens, I., and Davis, S., Calculus, 12th Ed. John Wiley and Sons (Asia) P. Ltd, Singapore, 2002. (Scope as in Ch.0-3,6,10,12)
2. Courant, R. and John, F., Introduction to Calculus and Analysis (Vol I), Springer, 1999. (Scopes in Ch.4)

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Statistical Analysis Using Laboratory

Course Code: FMAP -1337

Course Outcomes:

After passing this course, the students will be able to:

CO:1 Apply spreadsheet functions such as SUM, COUNT, COUNTIF, MAX, MIN, and SORT to perform data organization, calculation, and analysis effectively.

CO:2 Prepare and analyze academic results by calculating total marks, percentages, grades, SGPA, and credits using Spreadsheet formulae and functions.

CO:3 Construct and interpret graphical representations including histograms, bar charts, pie charts, and two-dimensional graphs for better data visualization.

CO:4 Compute and interpret statistical measures such as central tendency, dispersion, skewness, kurtosis, correlation, and regression using Spreadsheet tools.

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Statistical Analysis Using Laboratory

Course Code: FMAP -1337

Examination Time: 3 Hours

Max. Marks: 50

L T P

0 0 4

Practical: 35

C A: 15

List of Practicals

1. Introduction of basics of excel and functions such as 'sum', 'count', 'countif', 'max', 'min', 'sort' etc.
2. Create frequency distribution table; plot histogram, bar chart, pie chart, etc.
3. Plotting two dimensional graphs.
4. To find measures of central tendency for a given data.
5. To find measures of dispersion for a given data.
6. To find measures of skewness and kurtosis for a given data.
7. To find Karl Pearson Coefficient of correlation and rank correlation coefficient for a givendata.
8. To find regression coefficient for bivariate data and plotting regression lines.

Reference Books:-

1. S. C. Gupta, Fundamentals of Mathematical Statistics, Himalaya Publication.
- K. Berk, Partrick Carey, Data Analysis with Microsoft Excel.

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Programming Language - I

Course Code: FMAM- 1130

Course Outcomes

After passing course the student will be able to:

CO1: Articulate various kind of software and hardware used in computers.

CO2: Work with different set of operations in C programming.

CO3: Apply various control statements of C Programming Language for designing solutions to different real world problems.

CO4: Implement single and multidimensional arrays for representing complex data collections.

Master of Science (Mathematics)(FYIP)

Semester-I

Session-2026-27

Course Title: Programming Language - I

Course Code: FMAM- 1130

Examination Time: (3+3) Hours

Max. Marks: 100

Practical-30

Theory: 40

CA: 30

L T P

3 0 1

Instructions for the Paper Setters: Eight questions of equal marks (8 Marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four).

Candidates are required to attempt five questions, selecting at least one question from each Section.

The fifth question may be attempted from any Section.

Unit I

Introduction to Computer Programming, Program Development life cycle, algorithms, flow chart, decision table & pseudo code.

Unit II

Introduction to C language, data types, Operators and Expression, Input/output Functions, Structured programming elements, Control statements: Branching, Jumping, Looping Arrays.

Unit III

Pointers, Functions: Inbuilt Functions, User defined Functions, Recursion, Storage Classes in C, dynamic memory management.

Unit IV

Strings, Structure and union, Reference variables, basics of searching and sorting techniques, file handling in C

References / Textbooks:

1. E. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill (2002), 5th edition.
2. Stephen G. Kochan, Programming in C, Pearson Education (2015), 4th edition.
3. R.S. Salari, Application Programming in C, Khanna Book Publishing (2012), 4th edition.
4. Anshuman Sharma, Learn programming in C, Lakhanpal Publishers (2016), 7th edition.

Practicals

Development of Computer Programs using C language for:

- Separation of odd and even numbers
- Summation of N Natural numbers
- Generating Fibonacci series
- Roots of quadratic and Cubic equations
- Evaluating various mathematical functions: $\exp(x)$, $\log(x)$, $\sin(x)$, $\cos(x)$ etc using Taylor series expansion
- Arranging numbers in ascending and descending orders
- Finding maximum/minimum of numbers, for matrix operations, determinants, and inverse of 3x3 matrix, elementary numerical methods and statistical methods.

SEMESTER-II

CO1: ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ (ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ, ਯੋਜਕ ਅਤੇ ਵਿਸਮਿਕ)ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

CO2: ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ (ਸਾਧਾਰਨ ਵਾਕ, ਸੰਯੁਕਤ ਵਾਕ, ਮਿਸ਼ਰਤ ਵਾਕ, ਬਿਆਨੀਆ ਵਾਕ, ਪ੍ਰਸ਼ਨ ਵਾਚਕ ਵਾਕ ਅਤੇ ਹੁਕਮੀ ਵਾਕ) ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਇਸ ਦੀ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ਅਤੇ ਉਨ੍ਹਾਂ ਦੀ ਭਾਸ਼ਾ ਤੇ ਪਕੜ ਮਜ਼ਬੂਤ ਹੋਵੇਗੀ।

CO3: ਪੈਰ੍ਹਾ ਰਚਨਾ ਅਤੇ ਸੰਖੇਪ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO4: ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ ਜ਼ਾਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ।ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks : 50

Theory : 35

CA : 15

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ 1 ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ ਜ਼ਰੂਰ ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 7 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ (ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ, ਯੋਜਕ ਅਤੇ ਵਿਸਮਿਕ)

ਯੂਨਿਟ-II

ਪੰਜਾਬੀਵਾਕਬਣਤਰ : ਮੁੱਢਲੀਜਾਣਪਛਾਣ

(ੳ) ਸਾਧਾਰਨਵਾਕ, ਸੰਯੁਕਤਵਾਕ ਅਤੇ ਮਿਸ਼ਰਤਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

(ਅ) ਬਿਆਨੀਆਵਾਕ, ਪ੍ਰਸ਼ਨਵਾਚਕਵਾਕ ਅਤੇ ਹੁਕਮੀਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

ਯੂਨਿਟ-III

ਪੈਰਾਚਰਨਾ

ਸੰਖੇਪ ਰਚਨਾ

ਯੂਨਿਟ-IV

ਚਿੱਠੀਪੱਤਰ (ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ)

ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ (ਲਿਸਟ ਨਾਲ ਨੱਥੀ ਹੈ)

COURSE OUTCOMES

CO1:ਆਧੁਨਿਕ ਇਕਾਂਗੀਪੁਸਤਕ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਇਕਾਂਗੀਪ੍ਰਤੀਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ।

CO2: ਆਧੁਨਿਕ ਇਕਾਂਗੀ ਪੁਸਤਕ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਇਕਾਂਗੀ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO3:ਮੁਹਾਵਰੇ ਅਖਾਣਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ। ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

CO4:ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਪੰਜਾਬੀਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂਨੂੰ ਸਮਝਣਲਈਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂਦਾਵਿਕਾਸ ਕਰਨਾ ਹੈ।

ਸਮਾਂ : 3 ਘੰਟੇ

L-T-P

2-0-0

Maximum Marks: 50

Theory : 35

CA :15

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨਾਂ ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟਜ਼ ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 7 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅਗੇ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਆਧੁਨਿਕ ਇਕਾਂਗੀ, ਸੰਪਾਦਕ ਰੋਸ਼ਨ ਲਾਲ ਅਹੂਜਾ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ

ਸੁਹਾਗ, ਜ਼ਫਰਨਾਮਾ, ਇੱਕ ਐਤਵਾਰ ਇਕਾਂਗੀਆਂ ਪੜ੍ਹਾਈਆਂ ਜਾਣਗੀਆਂ।

(ਸਾਰ, ਵਿਸ਼ਾਵਸਤੂ)

8 ਅੰਕ

ਯੂਨਿਟ-II

ਆਧੁਨਿਕ ਇਕਾਂਗੀ, ਸੰਪਾਦਕ ਰੋਸ਼ਨ ਲਾਲ ਅਹੂਜਾ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ

ਬੰਬ ਕੇਸ, ਜੁੱਤੀਆਂ ਦਾ ਜੋੜਾ, ਕੱਚ ਦਾ ਗਜਰਾ ਇਕਾਂਗੀਆਂ ਪੜ੍ਹਾਈਆਂ ਜਾਣਗੀਆਂ।

(ਸਾਰ, ਵਿਸ਼ਾਵਸਤੂ)

8 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਮੁਹਾਵਰੇ ਅਖਾਣ

(ਅ) ਘਰੇਲੂ ਚਿੱਠੀ ਪੱਤਰ 8 ਅੰਕ

ਯੂਨਿਟ-IV

(ੳ) ਸ਼ਬਦਸ਼੍ਰੇਣੀਆਂ : ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ

(ਅ) ਸ਼ਬਦਸ਼੍ਰੇਣੀਆਂ: ਕਿਰਿਆਵਿਸ਼ੇਸ਼ਣ, ਸੰਬੰਧਕ, ਯੋਜਕ, ਵਿਸਮਿਕ 8 ਅੰਕ

Master of Science (Mathematics)(FYIP)

Semester–II

Session- 2026-27

Course Title: Punjab History and Culture (C. 320 to 1000 A.D)

Course Code: FMAL-2431

COURSE OUTCOMES

After completing Semester II and course on Ancient History of Punjab students will be able to understand:

CO 1: The reasons and impact of Alexander's invasions and to comprehend various factors leading to rise and fall of empires and emergence of new dynasties and their administration specifically of Maurya rule in general and Ashok in particular

CO 2: art and architecture of Gupta period and the Indo-Greek style of architecture under Gandhara School

CO 3: To have an insight into the socio-cultural history under Harshvardhan and punjab under the stated period

CO 4: To enable students to have thorough insight into the various forms/styles of Architecture and synthesis of Indo - Greek Art and Architecture in Punjab

Master of Science (Mathematics) (FYIP)

Semester–II

Session- 2026-27

Course Title: Punjab History and Culture (C. 320 to 1000 A.D)

Course Code: FMAL-2431

Examination Time: 3 Hours

Credits L-T-P: 2-0-0

Contact Hours: 2 Hrs/Week

Max. Marks: 50

Theory: 35

CA: 15

Instructions for the Paper Setter:

1. Question paper shall consist of four Units
2. Examiner shall set 8 questions in all by selecting Two Questions of equal marks from each Unit.
3. Candidates shall attempt 5 questions in 500 words, by at least selecting One Question from each Unit and the 5th question may be attempted from any of the four Units.
4. Each question will carry 7 marks

Unit I

1. Alexander's Invasion's and Impact
2. Administration of Chandragupta Maurya with special reference to reforms introduced by Ashok

Unit II

3. The Kushans: Gandhar School of Art
4. Gupta Empire: Golden Period-Social and cultural life, Art and Architecture)

Unit III

5. The Punjab under Harshvardhana-Society and Religion During the time of Harshvardhana
6. Socio-cultural History of Punjab from 7th to 1000 A.D.

Unit IV

7. Development of Languages and Education with Special reference to Taxila
8. Development to Art and Architecture

Suggested Readings

- B.N. Sharma: *Life in Northern India*, Delhi. 1966
- Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
- L. M Joshi (ed), *History and Culture of the Punjab*, Art-I, Punjabi University, Patiala, 1989 (3rd edition)
- L.M. Joshi and Fauja Singh (ed.), *History of Punjab*, Vol.I, Punjabi University, Patiala, 1977.

Master of Science (Mathematics)(FYIP)

Semester–II

Session- 2026-27

Course Title: Communicative English-II

Course Code: FMAL-2102

Course Outcomes

At the end of this course, students will be able to:

CO1: distinguish the main points from the supporting details and the irrelevant information from the relevant one through Note-Taking

CO2: learn the skills and strategies of effective writing by paragraph writing

CO3: enhance their reading and analyzing power of texts through guided reading through the study of “Making Connections” by Kenneth J. Pakenham

CO4: be acquainted to the techniques of effective essay writing

Master of Science (Mathematics)(FYIP)

Semester–II

Session- 2026-27

Course Title: Communicative English-II

Course Code: FMAL-2102

Examination Time: 3 Hours

Max. Marks: 50

Theory: 35

CA:15

L T P

2 0 0

Instructions for Paper Setters:

Eight questions of equal marks (07 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Practical question on Note Making, Summarizing and Abstracting as given in The Written Word by Vandana R. Singh

Unit II

Practical question on Paragraph writing as prescribed in The Written Word by Vandana R. Singh

Unit III

Theoretical questions based on ABC of Good Notes as prescribed in The Written Word by Vandana R. Singh, Unit-III from Making Connections: A Strategic Approach to Academic Reading by Kenneth J. Pakenham, Second Edition

Unit IV

Practical question on Essay writing from The Written Word by Vandana R. Singh, Unit - IV from Making Connections: A Strategic Approach to Academic Reading by Kenneth J. Pakenham, Second Edition.

Text books:

- The Written Word by Vandana R. Singh, Oxford University Press, New Delhi
- Making Connections: A Strategic Approach to Academic Reading by Kenneth J. Pakenham, second edition.

Master of Science (Mathematics)(FYIP)

Semester–II

Session-2026-27

Course Title: Sequences and Series

Course Code: FMAL-2333

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate an understanding of sequences and series and their convergence, Cauchy criterion, sub sequence and algebra of limit of sequences.

CO 2: Know and describe the behaviour of Infinite series using various tests like comparison test, Cauchy Integral test. Ratio test, Raabe's test.

CO 3: Distinguish between the absolute convergence and conditional convergence.

CO 4: Manage to solve the problem related to Fourier series expansion, Fourier series for even and odd functions and half range series.

Master of Science (Mathematics)(FYIP)

Semester–II

Session-2026-27

Course Title: Sequences and Series

Course Code: FMAL-2333

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA: 30

L T P

4 1 0

Instructions for Paper Setters:

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Sequence, sub sequence, bounded sequences, monotone sequences, convergence, Cauchy criterion, algebra of limit of sequences (proofs with ϵ -N rigor), Sandwich Theorem.

Unit II

Infinite series, Sequences of partial sums, convergence and divergence of series, series of non-negative terms, comparison test, Limit Comparison test, Cauchy's nth root test, Cauchy's Condensation test, Cauchy's Integral test. Ratio test, Raabe's test (all tests with proofs).

Unit III

Logarithmic test and Gauss test, Alternating series, Leibnitz Test, absolute and conditional convergence, Convergence of Power Series, Taylor Series.

Unit IV

Periodic functions, trigonometric series, Fourier series expansion, Fourier series for even and odd functions, half range series.

Text Book:

George B. Thomas and Ross L. Finney, Calculus and Analytic Geometry, Pearson publication, 9th Edition, 1998.

Reference Books:

1. S. C. Malik and S. Arora, Mathematical Analysis, New Age International Publishers, New Delhi, 2nd Edition, 2005.
2. Sudhir R. Ghorpade and B.V. Limaye, A course in calculus and real analysis, Springer, 2006.

Master of Science (Mathematics)(FYIP)

Semester–II

Session-2026-27

Course Title: Algebra

Course Code: FMAL-2334

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of Groups, Rings, Fields and Vector space with examples.

CO2: Understand the concepts of Linearly independent and dependent vectors, linear span, subspace generated by a subset, basis and dimension.

CO3: Understand matrix representation of a linear transformation and to determine Linear transformations, null space and range space of a linear transformation

CO 4: Obtain Eigen values, Eigen vectors and to solve the System of linear equations over a field.

Master of Science (Mathematics)(FYIP)

Semester–II

Session-2026-27

Course Title: Algebra

Course Code: FMAL-2334

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA: 30

L T P

4 1 0

Instructions for Paper Setters:

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Definition of Group, Ring and Fields with examples. Definition of a vector space, subspaces with examples. Direct sum of subspaces

Unit-II

Linearly independent and dependent vectors, linear span, subspace generated by a subset, basis and dimension.

Unit-III

Linear transformations, null space and range space of a linear transformation, rank and nullity of a linear transformation, matrix representation of a linear transformation.

Unit-IV

Elementary matrix operations and Elementary matrices, Row rank and Column rank of a matrix and their equality, System of linear equations over a field, Characteristic polynomial of a matrix, Cayley-Hamilton Theorem, Eigen values and Eigen vectors.

Text Book:

S. Axler, Linear Algebra Done Right, Springer, Second edition, 1997.

Reference Books:

1. S. H. Friedberg, A.J. Insel and L.E. Spence., Linear Algebra, PHI Learning Pvt. Ltd, New Jersey, 1979

2. V. Sahai and V. Bist., Linear Algebra, Narosa Publishing House Pvt. Ltd, Delhi, 2013

3. Andreescu, T. and Andrica, D. ,Complex Numbers from A to Z, Birkhauser,2006.

Master of Science (Mathematics)(FYIP)

Semester–II

Session-2026-27

Course Title: Object Oriented Programming C++

Course Code: FMAM-2135

After the completion of this course, the student will be able to:

CO1: Comprehend the concepts of Object-Oriented Programming Paradigm.

CO2: Identify the use of access specifiers and different types of constructors in class.

CO3: Apply function and operator overloading.

CO4: Comprehend different types of inheritance and polymorphism.

Master of Science (Mathematics)(FYIP)

Semester–II

Session-2026-27

Course Title: Object Oriented Programming C++

Course Code: FMAM-2135

Examination Time: 3 Hours

Max. Marks: 100

Practical-30

Theory: 40

CA: 30

L T P

3 0 1

Instructions for the Paper Setters:

Eight questions of equal marks (8 Marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Unit I

GettingStarted:Introduction.AbriefhistoryofC++,Variable,Constant,Expression,Statements,Comments and keywordsofC++.

Operator: Arithmetic, Relational, Logical, Assignment, Increment/Decrement, Conditional, Precedence of Operators. Datatype, Type conversion, library function.

Input/Output Statements: Inputting using cin and outputting using cout statements, Preprocessor directives.

Basic Program construction: A complete C++ program: invoking Turbo C++, naming your program, using the editor, saving your program, compiling and linking, running the program Errors: Compiler, linker and runtime.

Other IDE features: Compiling and linking, shortcut exiting from IDE, examining files, opening an existing file, DOS shell.

Unit II

Programming Paradigms: Introduction to the object oriented approach towards programming by discussing Traditional, Structured Programming methodology.

Objects & Classes: Object Definition, Instance, Encapsulation, Data Hiding, Abstraction, Inheritance, Messages, Method, Polymorphism, Classes.

Object Oriented Programming using C++: Characteristics of OOP, Overview of C++, Objects and Classes, Member functions and data, private & public, constructor & destructor, Constructor Overloading, Types of Constructors.

Unit III

Operator Overloading: Overloading unary operators, Overloading binary operators, Data conversion, Pit-falls operator overloading and conversion.

Function Overloading: Function Overloading, Default Arguments, Ambiguity in Function Overloading.

Unit IV

Inheritance: Concept of inheritance, Base & derived classes, Access Specifiers, Class Hierarchies, Types of Inheritance with examples.

Polymorphism: Virtual functions, friend functions, static function, this pointer, polymorphism, Types of Polymorphism with examples, Templates

References / Textbooks:

1. Herbertt Schildt, C++: The Complete Reference, Tata McGraw-Hill Education India, 4th Edition.
2. Bjarne Stroustrup, The C++ Programming Language, Addison – Wesley Professional (2013), 4th Edition
3. G.S. Baluja, C++ Program Design (w/CD), Khanna Book Publishing Company (2015), 2nd edition.
4. Stanley Lippman, Josee Lajoie, Barbara Moo, C++ Primer, Addison-Wesley Professional (2012), 5th edition.
5. Richard Johnsonbaugh and Martin Kalin, Object Oriented Programming in C++, Pearson Education (1999), 2nd Edition

Master of Science (Mathematics) (FYIP)

Semester-II

Session-2026-27

Course Title: Algebra Laboratory

Course Code: FMAP-2336

Course Outcomes

After passing this course, the students will be able to:

CO 1: To develop practical skills in applying computational tools for performing various matrix operations, including addition, multiplication, inversion, transposition, and determinant calculation.

CO 2: To enhance problem-solving abilities in linear algebra by determining matrix rank, reducing matrices to row echelon form, and solving systems of linear equations using numerical methods.

CO 3: To enable students to analyze and interpret matrix properties through the computation of eigenvalues, eigenvectors, and other numerical techniques using built-in software functions.

CO 4: To bridge theoretical concepts of linear algebra with practical implementation using computational packages, fostering efficiency, accuracy, and deeper understanding of engineering mathematics applications.

Master of Science (Mathematics) (FYIP)

Semester–II

Session-2026-27

Course Title: Algebra Laboratory

Course Code: FMAP-2336

Examination Time: 3 Hours

Max. Marks: 50

Practical: 35

CA: 15

L T P

0 0 2

List of Practicals (using any package)

1. Introduction to the computer package in the practicals.
2. Matrix operations: addition, multiplication, inverse, transpose, determinant of matrix.
3. Find Rank of matrix: Row Rank, Column Rank.
4. Find row reduced echelon form
5. Create the coefficient matrix A and vector b. Solve for x using the inverse, using the built-in function.
6. Solving a linear system, using Gauss elimination numerically.
7. Finding eigenvalues and eigenvectors, numerically.

Reference Books:-

1. S.S. Sastry, Engineering Mathematics - Volume I (4th Edition), PHI, 2008.
2. S.S. Sastry, Engineering Mathematics - Volume II (4th Edition), PHI, 2008.

Master of Science (Mathematics) (FYIP)
Semester–II
Session-2026-27
Course Title: Numerics Using SCILAB
Course Code: FMAM-2330

Course outcomes:

After passing this course, the students will be able to:

CO1: Apply basic Scilab commands, arithmetic operations, mathematical functions, and array operations to perform numerical computations.

CO2: Use Scilab programming constructs, matrices, user-defined functions, and numerical techniques to solve mathematical problems.

CO3: Create and analyze 2D and 3D graphical representations of functions, curves, and surfaces using Scilab.

CO4: Utilize Scilab for modeling, simulation, and analysis of real-world problems and dynamical systems.

Master of Science (Mathematics) (FYIP)
Semester–II
Session-2026-27
Course Title: Numerics Using SCILAB
Course Code: FMAM-2330

Examination Time: 3 Hours

Max. Marks: 100

Practical-30

Theory: 40

CA: 30

L T P
3 0 1

Instructions for Paper Setters:

Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit I

Scilab console and Editor windows, arithmetical operations (+, -, *, /, ^), the commands such as ;, format(16), //, clear, clc, sqrt, %e, %pi, %i, disp, factorial, exp, log, log10, sin, cos, sec, csc, tan, cotg, asin, acos, asec, acsc, atan, acot, sinh, cosh, etc., array operations (.+, .-, .* , ./, .^).

Unit II

Scilab files (.sce, .scf), matrices and matrix operations, relational operators (==, <>, <=, >=, %T, %F, &, |, ~), strings“ ”, for loop, if and elseif commands, user defined functions, feval, executing a .sce file, eigen values & eigen vectors, solving linear equations using SCILAB.

Unit III

Graphics using Scilab (2D and 3D graphics), plotting graphs of elementary functions, plotting parametric curves (param3d) and surfaces (surf), handling graphics.

Unit IV

Usage of SCILAB in Solving Problems such as: Motion of Pendulum, Calculation of EMI for home loan, Modeling & Simulation of Car, Errors and approximation, Two dimensional dynamical systems, phase portrait, equilibrium points & their classification (using SCILAB).

Text Book:

1. Campbell, S.L., Chancellor, J.P., Nikoukhah, R. Modeling and Simulation in Scilab/Scios, Springer, 2006.
2. Jain, C., Advanced Programming in SCILAB, Alpha Science International, Oxford, UK, 2020.

Note: Practical: The practical examination will include applications and concepts drawn from the prescribed theory syllabus only.