



ST. WILFRED'S COLLEGE OF ARTS, COMMERCE & SCIENCE

(Affiliated to Mumbai University)

Opp. Ayush Resort, Near Shedung Toll Plaza, Old Mumbai-Pune Highway, Panvel, Navi Mumbai-410206
Ph. No. +91-8655678500, 9699625148 • College Code 1033 • E-mail: stwilfred.acs@gmail.com • website : www.stwilfreds.org

COURSE FILE

Department of Mathematics

Faculty Name: Mr Sourabh Kumar

Subject: Mathematics

Class: B.Sc. (Sem -I)

Paper: ALGEBRA

Year: 2022-23



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TABLE OF CONTENTS



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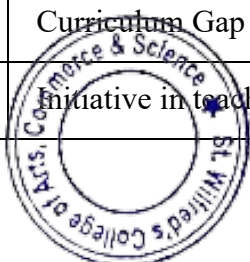


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S.No.	Topic
1.	Department Academic Calendar
2.	Subject Allocation
3.	Class Time Table
4.	Syllabus
5.	List of books
6.	Vision, Mission statement of the institution and department
7.	Program Outcomes(POs)
8.	Program Specific Outcomes(PSOs)
9.	Course Outcomes (COs)
10.	CO-PO Mapping
11.	Lecture Delivery Lecture Plan VI-B Contents beyond syllabus Subject notes List of subject books in the library
12.	Discussion on Advance topics
13.	Internal Assessment
14.	Assignments
15.	Measures taken for weak and advance learner list of weak and advance learner Timetable of remedial classes
16.	Curriculum Gap And Justification
17.	Initiative in teaching learning



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18.	Attainments of CO's
19.	Result
20.	Question Bank
21.	University Question paper
22.	Attendance Register



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Academic Calendar for UG



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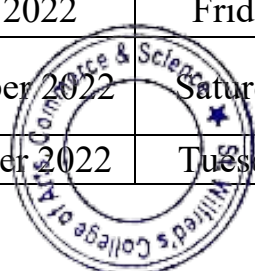
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Academics Calender - 2022-2023

First Half Session - June 2022 - November 2022

Date	Day	Event/Activity	Holiday/ Celebrations/ Activity
20th June 2022	Monday	New Sesion for Second Year & Third Year	Oreintation
24th June 2022	Friday	Career Counselling session for school students	Activity
11th July 2022	Monday	Poster Creation Program	Activity
9th August 2022	Tuesday	celebratiton of Rakshabandhan Festival	Celebration
12th August 2022	Friday	Celebartion of Globle Youth Day	Celebration
15th August 2022	Monday	Independence Day	Celebration
***	***	Admission Process for First Year	
17th August 2022	Wednesday	Orientation Day for First Year	Orientation
22nd August 2022	Monday	College opening date for first year	
27th August 2022	Saturday	Seminar on Personality Development	Seminar
31st August 2022	Wednesday	Ganesh Chaturthi	Holiday
03rd September 2022	Saturday	Plantation Day by NSS Wing	Activity
05th September 2022	Monday	Teacher's Day Celebration & Mehendi ,Face Competition , Phone Photography & Rangoli competition	Celebration
8th September 2022	Thursday	Celebration Of Globle Literacy Day	Celebration
9th september 2022	Friday	Gallery Visit	Activity
10th September 2022	Saturday	Fresher's Party	Celebration
16th september 2022	Friday	Poster Creation Contest	Activity
19th September 2022	Monday	Unit Test I	
22nd & 23rd September 2022	Thursday & Friday	Parent Teachers Meeting (PTM)	
24th September 2022	Saturday	Volley Ball Inter-Collegiate Tournament	Activity
27th september 2022	Tuesday	Celebration of World Travel	Celebration



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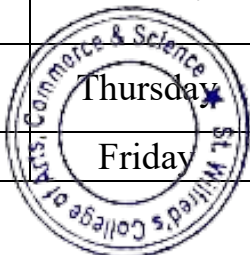
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		Day	
29th September 2022	Thursday	Alumni Engagemnet Program/ Nukkad Natak	Activity
01st October 2022	Saturday	Seminar on Soft Skills Development	Seminar
2nd October 2022	Sunday	Gandhi Jayanti	Holiday
04th October 2022	Tuesday	Dandiya Celebration	Celebration
5th October 2022	Wednesday	Vijyadashmi	Holiday
15th October 2022	Saturday	World Food Day Celebration	Celebration
22nd October 2022	Saturday	Diwali Celebration	Celebration
23rd to 27th october 2022	Wednesday to Sunday	Diwali Break	Holiday
30th October 2022	Friday	Semester-end Submissions	
31st october 2022	Monday	National Harmony Day	Celebration
8th November 2022	Tuesday	Gurunanak Jayanti	Holiday
21st November 2022 onwards	Monday	Semester -end Examinations	
26th November 2022	Saturday	Commitment on Constitution Day	Activity

Second Half Session -December 2022 - May 2023

Date	Day	Event/Activity	
01st December 2022	Thursday	AIDS Awareness Program	Activity
3rd December 2022	Saturday	Field Visit	Activity
10th December 2022	Saturday	Human Rights Day	Celebration
17th December 2022	Saturday	Debate Competition	Activity
24th December 2022	Saturday	Christmas Celebration	Celebration
07th January 2023	Saturday	VIBGYOR - Intercollege Dance & Singing competition	Activity
12th January 2023	Thursday	National Youth Parliament Day	Celebration
18th January	Friday	Badminton Tournament	Activity



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2023			
19th to 21st January 2023	Thursday to Saturday	Annual Sports Meet	Activity
23rd January 2023	Monday	Parakarma Diwas	Celebration
25th January 2023	Wednesday	Educator Campaign	Celebration
26th January 2023	Thursday	Republic Day Celebration	Celebration
28th January 2023	Saturday	One day Picnic	Activity
30th & 31st January 2023	Monday & Tuesday	Parent Teachers Meeting (PTM)	
2nd February 2023	Thursday	Industrial Visit for all streams	Activity
4th February	Saturday	Awareness Rally for Organ & Eye Donation Campaign (NCC Wing)	Activity
06th to 08th February 2023	Monday to Wednesday	Unit Test 2	
13th February 2023	Monday	Chocolate Day / Rose Day / Red & White Day	Celebration
14th February 2023	Tuesday	Mismatch Day	Celebration
15th February 2023	Wednesday	Twins Day	Celebration
16th February 2023	Thursday	Halloween Day	Celebration
17th February 2023	Friday	Traditional Day	Celebration
18th February 2023	Saturday	Mahashivratri	Holiday
28th February 2023	Tuesday	Science exhibition (Sciencia 2023)	Activity
04th March 2023	Saturday	Annual day celebration	Celebration
8th March 2023	Wednesday	Womens Day Celebration and Disaster Management One Day Workshop by NSS Wing /	Celebration




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15th March 2023	Wednesday	Alumni Meet	Activity
22th March 2023	Wednesday	Gudi Padwa	Holiday
30th March 2023	Monday	Semester -end Submissions	
7th April 2023	Friday	Celebration of Globle Health Day	Celebration
22nd April 2023	Saturday	Celebration Globle Environmental Day	Celebration
23rd April 2023	*****	Semester-end Exams	
5th June 2023	Monday	Bird Conservation campaign, long distance run	Activity
21st June 2023	Wednesday	Celebration of International Yoga Day	Celebration



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Subject - Allocation



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NAME OF DEPARTMENT: __ MATHEMATICS

Name of Faculty: Mr. Sourabh Kumar

1. Qualification. M.Sc NET
2. Specialization APPLIED MATHEMATICS
3. Total experience 5 Year
4. Special training / FDP/Certification on concern and allied subject. 1

S.No.	Name of subject	Year	Name of Class	Experience in subject	Preference (1,2,3,4)	Result of Previous Year
1	CALCULUS I	2022-23	B.SC. PT-I	7	1	95%
2	ALGEBRA	2022-23	B.SC. PT-I	7	2	95%
3	LINEAR ALGEBRA	2022-23	B.SC. PT-II	7	3	85%
4	ORDINARY DIFFERENTIAL EQUATION	2022-23	B.SC. PT-II	7	4	85%
5	NUMERICAL METHODS	2022-23	B.SC. PT-III	7	5	86%
6	DISCRETE MATHEMATICS	2022-23	B.SC. PT-III	7	6	86%
7	ALGEBRA	2022-23	B.SC. PT-III	7	7	95%

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Faculty Signature

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ClassTime Table



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Class Time Table



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TIME TABLE

	9:20-10:00	10:00 – 10:40	10:40 – 11:20	11:20 – 12:30	12:30 – 1:00	1:00 – 1:50	1:50 – 2:40	2:40 – 3:30	3:30-4:30
Monday	Biotech I B1	Chem I C1	Botany I B1	FC	L U N C H	Botany I practical		Remedial classes	VAC
	Physics I P1		Math I M1			Maths I practical		Remedial classes	VAC
Tuesday	Biotech I B1	Chem I C2	Botany I B1	FC		Botany II practical		Remedial classes	VAC
	Physics I P1		Math I M1			Maths II practical		Remedial classes	VAC
Wednesday	Biotech I B1	Chem I C3	Botany I B1	FC		biotech I practical		Remedial classes	VAC
	Physics I P1		Math I M1			physics I practical		Remedial classes	VAC
Thursday	Biotech II B2	Chem II C1	Botany II B2	library		biotech II practical		Remedial classes	VAC
	Physics II P2		Math II M2	library		physics II practical		Remedial classes	VAC
Friday	Biotech II B2	Chem II C2	Botany II B2	library		Chem practical C1 / C2 / C3		Remedial classes	VAC
	Physics II P2		Math II M2	library				Remedial classes	VAC
Saturday	Biotech II B2	Chem II C3	Botany II B2	library		Chem practical C1 / C2 / C3		Remedial classes	VAC
	Physics II P2		Math II M2	library				Remedial classes	VAC

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Syllabus



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B.SC (SEM-I) PAPER –II(ALGEBRA) Syllabus

Unit 1: Real Number System (15 Lectures)

1. Real number system \mathbb{R} and order properties of \mathbb{R} , absolute value $||$ and its properties.
2. AM-GM inequality, Cauchy-Schwarz inequality, Intervals and neighborhoods, Hausdorff property.
3. Bounded sets, statements of I.u.b. axiom and its consequences, Supremum and Infimum, Maximum and minimum, Archimedean property and its applications, density of rationales.

Unit II: Sequences (15 Lectures)

1. Definition of a sequence and examples, Convergence of sequences, every convergent Sequences is bounded. Limit of a convergent sequence and uniqueness of limit, Divergent sequences.
2. Convergence of standard sequences
3. Algebra of convergent sequences, sandwich theorem, monotone sequences, monotone Convergence theorem and consequences as convergence of $1 +$.
4. Definition of subsequence, subsequence of a convergent sequence is convergent and converges to the same limit, definition of a Cauchy sequences, every convergent sequences s a Cauchy sequence and converse.

Unit III: Limits and Continuity (15 Lectures)

1. Graphs of same standard functions such as
2. $|x|$, e^x , $\log x$, $ax^2 + bx + c$, $\frac{1}{x}$, x^n ($n \geq 3$), $\sin x$, $\cos x$, $\tan x$, $\sin \frac{1}{x}$, x^2 , $\sin \frac{1}{x}$ over suitable intervals of \mathbb{R} .
3. Definition of Limit $\lim_{x \rightarrow a} f(x)$ of a function $f(x)$, evaluation of limit of simple functions using the ϵ - δ definition, uniqueness of limit if it exists, algebra of limits, limits of composite function, sandwich theorem, left-hand-limit $\lim_{x \rightarrow a^-} f(x)$, righthand-limit $\lim_{x \rightarrow a^+} f(x)$, non-existence of limits, $\lim_{x \rightarrow \infty} f(x)$, $\lim_{x \rightarrow -\infty} f(x)$ and $\lim_{x \rightarrow \infty} f(x) = \pm\infty$.
4. Continuous functions: Continuity of a real valued function on a set in terms of limits, examples, Continuity of a real valued function at end points of domain, Sequential continuity, Algebra of continuous functions, discontinuous functions, examples of removable and essential discontinuity.



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Important Topics:

Cauchy Schwarz inequality, Hausdorff property, absolute value, Bounded sets, Supremum and Infimum, Maximum and minimum, Archimedean property and its applications, sequence, convergent sequence,
Uniqueness of limit, convergence of standard sequence



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ABC Analysis

UNITS	A	B	C	TEACHING METHODOLOGY
I	Real Number System, Order Properties, Bounded Set, Statement Of L.U.B. Intervals And Neighborhoods	AM-GM inequality Hausdorff property Supremum and infimum,	Cauchy-Schwarz inequality, density of rationales.	Black Board
II	Definition of a sequence and examples. Divergent sequences Algebra of convergent sequences	Convergence of seq. Limit of a convergent sequence	Every convergent sequences is bounded. uniqueness of limit sandwich theorem monotone convergence theorem	Black Board
III	Graphs of same standard functions Definition of Limit Continuous functions	evaluation of limit of simple functions using the ϵ - δ definition uniqueness of limit if it exists	Continuity of a real valued function on a set in terms of limit Algebra of continuous functions s	Black Board



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List of Subject Books in The Library



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S.No	Book Name	Author	Available in library
1.	Mathematical Analysis	S.C. MALIK SAVITA ARORA	YES
2.	Calculus	G.R. BATHLA & SONS	YES
3.	Problems In Calculus Of One Variable	IA MARON	YES
4.	Advance Calculus	OM SHARMA	YES
5.	Differential Calculus	JOSEPH ADWARDS	YES
6.	The Calculus Experience	VAIBHAV VARUN	YES
7.	Differential Calculus	BANSAL , BHAGAV & AGARWAL	YES
8.	Differential Calculus	DR. GOKHROO	YES
9.	Differential Calculus	DR. CHAURSIYA, DR. AGARWAL	YES
10.	Differential Calculus	MISHRA DAS GUOTA	YES



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Vision, Mission statement of the institution



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Vision

“Where the mind is without fear, where the head is held high.”

Our vision is to be a foremost institution of higher learning, renowned for academic excellence, innovation, and social responsibility. We endeavor to cultivate a vibrant learning community where students are empowered to discover their passions, think critically, and become leaders in their respective fields.



MISSION

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- The institution prioritizes offering education of a high standard to its students.
- Recognizing the importance of preparing students for the professional world, the college focuses on developing knowledge and skills that align with corporate requirements.
- The institution aspires to provide education of global standards, emphasizing quality and excellence.
- While aiming for excellence, the college also ensures that, the education it provides remains within an affordable range, making it accessible to a wider range of students.
- In addition to academic knowledge, the institution aims to foster the overall development of students, including moral, ethical, and aesthetic education.
- By enhancing students' skills and proficiency, the college aims to prepare them for leadership roles and entrepreneurship in the future.
- The institution emphasizes the importance of critical thinking skills, recognizing them as essential for success in the chosen field of study.
- St. Wilfred's College of Arts, Commerce & Science seeks to develop responsible citizens who possess knowledge across various disciplines.
- The environment is multi-cultural & congenial, fostering students' learning experiences and enhancing appreciation for diverse perspectives.



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Vision, Mission Statements of the Department



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Vision

"The Vision of the Science Department at St. Wilfred's Collage of Art, Commerce & Science is to provide a nurturing and innovative learning environment that empowers students with a profound understanding of the principles of science and cultivates a lifelong passion for scientific exploration. We are dedicated to fostering excellence in education, conducting pioneering experiments, and promoting scientific literacy, while embracing diversity and ethical responsibility."



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Mission

"Our Mission is to be a leading center of excellence in science education and research, where students and faculty collaborate to push the frontiers of knowledge and inspire the world. We aspire to:

1. **Educational Excellence:** To be renowned for our exceptional and accessible science education that equips students with the skills and knowledge to excel in any professional endeavor.
2. **Global Impact:** To produce graduates that have a profound and positive impact on society, addressing critical scientific, environmental, and societal challenges.
3. **Ethical Leadership:** To lead by example in ethical scientific practices and environmental responsibility.
4. **Community Engagement:** To actively engage with the community, sharing the wonder of science, and promoting scientific literacy.

In alignment with this mission, we aim to produce outstanding graduates who are critical thinkers, problem solvers, and agents of positive change, making significant contributions to the field of physics and society at large."



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Program Outcomes (POs)



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Programme Outcomes (POs) Bachelor of Science

PO 1	Knowledge: Learners are encouraged to apply the knowledge of science fundamentals to various solutions of complex problems. As such knowledge of the subject is the sole objective of any student learner.
PO2	Problem Analyses: Well equipped with an understanding of the analytical methods involved they are in a position to interpret and analyze results so obtained from experiments and draw suitable conclusions against their supported data acquired.
PO3	Ethics: While it is necessary to instill the spirit of competitiveness among students in a world of increasing competition, it is equally vital to develop a strong sense of ethics among learners that will help them develop some positive attitudes and values.
PO4	Soft-Skill Development: Apart from the attainment of knowledge and hand son skills in practical applicability of the subject learners need to be equipped with soft-skills and values which will help them function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary groups.
PO5	Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions checking out the degree to which these assumptions are accurate and valid and looking at our ideas and decisions (intellectual organizational and personal) from different perspectives.
PO6	Employability: With our learners long-term professional pursuits being quite varied many are drawn to careers that require scientific skills or technical expertise or strong quantitative reasoning abilities.
PO7	Life-long learning: With the pursuit of knowledge for either personal or professional reasons learners are also, encouraged to volunteer and be self-motivated that not only enhances society values active participation and personality development but also enhances self-sustainability competitiveness and employability.
PO8	Environment and Sustainability: An increased engagement with environment related concerns is appearing tangibly on global fronts; academics cannot and should not remain quarantined from this massive development. Through classroom discussions and research projects this programmed facilitates active dialogues with factors which influence human-ecology interactions.
PO9	Leadership skills: Ability to work effectively and lead respectfully with diverse teams; setting direction formulating a goal building a team who can help achieve the goal motivating and inspiring team members to engage with that goal and using management skills to guide people to the right destination in a smooth and efficient way.



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Program Specific Outcomes (PSOs)



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PSO1	Acquire a broad range of abilities that will allow them to tackle theoretical and experimental challenges
PSO2	To get employment in the banking sector, education, and fields requiring scientific and engineering expertise



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Bachelor of Science: MATHEMATICS



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Course Outcomes(COs) and Mapping with PO's



Mapping of PO, PSO&CO

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	1	3			2	1	2	1	2	
CO2		2	2	2		2		3	1	1
CO3	2		2	1	1		2	2	1	3
CO4	1	2	1	1	2	2	2	1	2	2
CO5	2			2	1	2				2

Paper: ALGEBRA

BECHELOR OF SCIENCE COURSE OUTCOMES

B.Sc.-I (MATHEMATICS)

USMT101: ALGEBRA

CO1	Solid understanding of fundamental algebraic concepts such as variables, constants, expressions, equations, inequalities, and functions.
CO2	Solving linear equations, quadratic equations, polynomial equations, rational equations, radical equations, and absolute value equations.
CO3	Solve systems of linear equations and inequalities using various methods such as substitution, elimination, and matrices.
CO4	Understand polynomial factorization and the relationship between roots and factors.
CO5	Able to graph various types of functions, including linear, quadratic, polynomial, rational, exponential, and logarithmic functions.



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Lecture Plan



Lecture Plan (2022-23)

B.SC (SEM-I)

PAPER-I(CALCULUS)

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Lecture Plan (2022-23)

B.SC (SEM-I)



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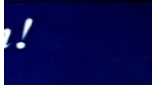
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	03-08-2022	Wednesday	AM-GM inequality	Black board	Discussion topic cover	
13	08-08-2022	Monday	Cauchy-Schwarz inequality	Interactive method	8-08-22	
14	09-08-2022	Tuesday	Intervals and neighbourhood	ppt	9-08-22	Open book test

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26	14-09-2022	Wednesday	Limit of a convergent sequence	Black board	14-09-22	Oral Test
27	19-09-2022	Monday	uniqueness of limit, Divergent sequences.	ppt	19-09-22	UNIT-TEST
28	20-09-2022	Tuesday	uniqueness of limit, Divergent sequences.	Black board	20-09-22	
29	21-09-2022	Wednesday	Convergence of standard sequences	ppt	21-09-22	Class Test
30	26-09-2022	Monday	Algebra of convergent sequences, sandwich theorem	Participative method	26-09-22	
31	27-09-2022	Tuesday	monotone sequences, monotone convergence theorem	Black board	27-09-22	
32	28-09-2022	Wednesday	Definition of subsequence, subsequence of a convergent sequence is convergent	Group discussion	28-09-22	
33	3-10-2022	Monday	subsequence of a convergent sequence is convergent and converges to the same limit	Black board	3-10-22	

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3

Principals
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			converges to the same limit			
34	4-10-2022	Tuesday	definition of a Cauchy sequences	Video lecture	4-10-22	
35	10-10-2022	Monday	every convergent sequences is a Cauchy sequence and converse	ppt	10-10-22	Open book test
36	11-10-2022	Tuesday	Graphs of same standard functions	Black board	11-10-22	
37	12-10-2022	Wednesday	Definition of limit	Participative method	12-10-22	
38	17-10-2022	Monday	Evaluation of limit of simple function, Uniqueness of limit if exists	Black board	17-10-22	
39	18-10-2022	Tuesday	Algebra of limits, limits of composite function	ppt	18-10-22	
40	19-10-2022	Wednesday	sandwich theorem, left-hand-limit	Participative method	19-10-22	
41	31-10-2022	Monday	righthand-limit, non-existence of limits	Black board	31-10-22	Student Presentation
42	1-11-2022	Tuesday	Continuous functions: Continuity of a real valued	Participative method	1-11-22	

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			function on a set in terms of limits			
43	2-11-2022	Wednesday	discontinuous functions, examples of removable and essential discontinuity	Black board	2-11-22	
44	7-11-2022	Monday	Remedial class	ppt	7-11-22	
45	9-11-2022	Wednesday	Remedial class	Black board	9-11-22	
46	14-11-2022	Monday	Remedial class	Black board	14-11-22	
47	15-11-2022	Tuesday	Remedial class	Participative method	15-11-22	Class Test
48	16-11-2022	Wednesday	Remedial class	Black board	16-11-22	

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Content Beyond syllabus

1. ALGEBRA

S.NO.	Topic:- SERIES
1.	Introduction:-SERIES
2.	Division of The Topic:- 1. Types of series 2. Test of convergence 3. Convergent series 4. Divergent series
3.	Conclusion:- Students are able to understand the series
4.	Division of The Topic: - 1. Types of series 2. Test of convergence 3. Convergent series 4. Divergent series



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SUBJECT NOTES



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group

Binary operation -

let A be a non empty set.

then a mapping $*$: $A \times A \rightarrow A$

is defined as binary operation. (Binary composition)

here $*$ is called binary operation (B.O) on set A .

eg.

		B.O
\mathbb{N}	+	✓
\mathbb{N}	-	X
\mathbb{Z}	+	✓
\mathbb{Z}	-	✓

• Closure -

let $a, b \in A$ then

$$a * b = c \in A$$

Note 1- Closure and Binary operation are same.

2. let $*$ be a B.O. on set A and $B \subset A$ then $*$ need not be B.O. on set B .

• Associative :-

let $a, b, c \in A$

$$\text{then } (a * b) * c = a * (b * c)$$

set \mathbb{Z} (integers)

i) $a * b = a + b$

ii) $a * b \neq a - b$

eg. $2, -3, 8$

$$(2 * -3) * 8$$

$$(2 - (-3)) * 8$$

$$2 * (-3 * 8)$$

$$2 * (-3 - 8)$$

$$2 * (-11)$$

13



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$$3) a * b = a \cdot b$$

$$4) a * b \neq a^b$$

Note If $*$ is associative in set A and $B \subseteq A$ then $*$ is also associative in set B .

Identity element -

$$\exists e \in A$$

$$\text{s.t. } a * e = e * a = a$$

here e is called identity element.

Eg. $A = \mathbb{Z}$

$$a * b = a + b \rightarrow 0$$

$$A = \mathbb{N}$$

$$a * b = a + b \rightarrow \text{not exist}$$

$$A = \left\{ \begin{bmatrix} a & c \\ 1 & d \end{bmatrix} \right\}$$

$$a * b = A + B \rightarrow \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$A = \mathbb{N}$$

$$a * b = \frac{ab}{2} \rightarrow e = 2$$

Note If identity element exist in A and B is subset of A ($B \subseteq A$) then identity element need not to be exist in B .

Inverse of an element -

$b \in A$ is called inverse element of $a \in A$ if

$$a * b = e = b * a.$$

eg. $(\mathbb{Z}, +)$

Note If Inverse element exist in A and $B \subseteq A$ then inverse need not to be exist in B .

* Commutative :-

$$a * b = b * a$$

$$\forall a, b \in A.$$



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Algebraic structure :-

A non empty set G equipped with one or more binary operations is called an algebraic structure.

eg. $(\mathbb{N}, +)$, $(\mathbb{Z}, +)$, $(\mathbb{I}, -)$, $(\mathbb{R}, +, \cdot)$ are example of algebraic structure.

Groupoid :-

Let G be a non empty set and $*$ be a binary operations defined on it. then algebraic structure $(G, *)$ is called groupoid or Quasi-Group.

Ex:- $(\mathbb{N}, +)$, (\mathbb{N}, \cdot) , (\mathbb{Z}, \cdot) , $(\mathbb{Z}, +)$ etc.

$(\mathbb{N}, -)$ → not a groupoid

Loop :-

A groupoid $(G, *)$ with an identity element is called a loop.

Ex:- $(\mathbb{N}, +)$ is not a loop.

(\mathbb{N}, \cdot) , $(\mathbb{Z}, +)$ are examples of loop.

Semigroup :-

An algebraic structure $(G, *)$ is called uni group if binary operation $*$ is associative.

i.e. $a*(b*c) = (a*b)*c$ $\forall a, b, c \in G$.

eg. $(\mathbb{N}, +)$, $(\mathbb{Z}, +)$, (\mathbb{N}, \cdot)

$(\mathbb{Z}, -)$ is not semigroup.

Monoid :-

A semigroup $(G, *)$ is called monoid if identity element 'e' or '1' exist in G .



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PPT



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Natural Numbers

- **Natural numbers** are the set of counting numbers which starts from 1.
- They are denoted by N

Example : $\{1, 2, 3, \dots\}$



Numbers



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Whole Numbers



Whole numbers are the set of numbers that include 0 plus the set of natural numbers.

Example : {0, 1, 2, 3, 4, 5,...}



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Integers

An integer is a whole number (not a fractional number) that can be positive, negative, or zero. It is denoted by Z .

Example : $Z = \{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$



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Terminating Decimals

- Terminating decimals are decimals that contain a finite number of digits.
- Examples:
 - 36.8
 - 0.125
 - 4.5

Repeating Decimals



- Repeating decimals are decimals that contain a infinite number of digits.
- Examples:
 - 0.333...
 - 7.689689...

Non Terminating Decimals

While expressing a fraction into a decimal by the division method, if the division process continues indefinitely, and zero remainder is never obtained then such a decimal is called Non-Terminating Decimal

OR

A non-terminating decimal is a decimal never repeats. Example :
0.076923....., 0.05882352.....

Supremum and Infimum

Integers, Rational Numbers and Real Numbers

Completeness of Real Numbers

Supremum and Infimum

Characterizations of Sup and of Inf



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1. Monotone Sequences

1) Definition

A sequence (s_n) is increasing if $s_n \leq s_{n+1}$ for all n .

A sequence (s_n) is decreasing if $s_n \geq s_{n+1}$ for all n .

A sequence is monotone if it is increasing or decreasing.

Action Plan for Supporting Weak Learners in College

1. Early Identification:

- Implement a system for early identification of weak learners through continuous assessments, class participation, and feedback from instructors.
- Arrange class test so identify specific areas of weakness and learning styles & arrange remedial classes on difficult topics.

2. Personalized Learning Plans:

- Develop personalized learning plans for each weak learner based on their strengths, weaknesses, and learning preferences.

3. Mentorship Programs:

- Implement mentorship programs pairing weak learners with experienced students or faculty members.
- Foster a supportive environment for open communication and guidance.

4. Specialized Courses and Workshops:

- Offer specialized courses or workshops designed to address foundational concepts and bridge knowledge gaps.
- Provide extra classes/overview sessions for specific topics causing difficulties.

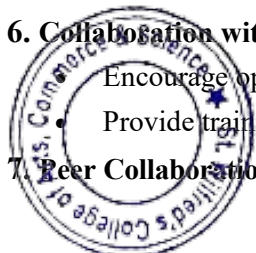
5. Regular Progress Monitoring:

- Establish a system for regular progress monitoring to track improvements and identify areas that still need attention.
- Communicate progress with both students and relevant faculty members.

6. Collaboration with Instructors:

- Encourage open communication between weak learners and their instructors.
- Provide training for instructors on recognizing and addressing diverse learning needs.

7. Peer Collaboration:




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- Promote collaborative learning environments where students can work together to strengthen their understanding of course material.
- Encourage peer mentoring and study groups.

8. Counseling and Psychological Support:

- Recognize the potential emotional and psychological impact of academic struggles.
- Provide access to counseling services for mental health support.

9. Continuous Improvement

- Regularly review and assess the effectiveness of the support programs

Curriculum Gap Identification process

BSc – I(sem-I)

Paper – I

Algebra

Following means are used for curriculum gap identification:

1. **Guidance from Program Advisory Committee:** The department is privileged to have distinguished personalities from industry and academia as members of PAC, who have been guiding us to improve the quality of education and to ensure that the budding engineers are able to meet the industry requirement. During the Program Advisory Committee meeting, various issues related to curriculum and the process of Outcome Based Education are discussed and refined further.
2. **Syllabus Feedback from Stakeholders:** Feedback about syllabus from stakeholders in identifying the curriculum gaps. These points are taken into consideration for modifying the teaching- learning process to make the students ready for the industry in a better way.

Gaps in the Syllabus & Justification

S. No.	Description	Proposed Action	Relevance with POs	Relevance with PSOs
1	Series	Additional Class	2	1
2	Beta and gamma function	Additional Class	10	2



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Content Beyond Syllabus

BSc – I(sem-I)

Paper – I

S. No.	Topic
1.	Series ,test of series, convergent series, Divergent series
2.	Beta and Gamma function



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