Koyana Education Society's

Balasaheb Desai College, Patan

Monthly Teaching Plan

2023-2024

Subject Name: Mathematics **Class:** B. Sc-I

Paper Name: **Month:** Mar-24

Date	Unit/Subunit	Teaching Method
01/03/24	Slip explanation of B. Sc I Practical	--
02/03/24 To 15/03/24	External examiner for T. Y. B. Sc. practical examination (Y. C. C. S. Karad, S. B. M. M, Rahimatpur, S. G. M, Karad)	--
16/03/24	Slip explanation B. Sc II Practical	--
18/03/24	Preparation of B. Sc II practical Examination	
19/03/24 to 22/03/24	B. Sc II practical examination	--
23/03/24	Preparation of B. Sc II theory paper setting	
24/03/24	Preparation of B. Sc II theory paper setting	
25/03/24 to 28/03/24	External examiner for S. Y. B. Sc. practical examination (Y. C. College of Science, Karad)	
29/03/24	Preparation of B. Sc II theory paper setting	
30/03/2024	B. Sc II Theory paper setting	

Head
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2023-2024

Subject Name: Mathematics **Class:** B. Sc-II

Paper Name: **Month:** Mar-24

Date	Unit/Subunit	Teaching Method
01/03/24	Slip explanation of B. Sc I Practical	--
02/03/24 To 15/03/24	External examiner for T. Y. B. Sc. practical examination (Y. C. C. S. Karad, S. B. M. M, Rahimatpur, S. G. M, Karad)	--
16/03/24	Slip explanation B. Sc II Practical	--
18/03/24	Preparation of B. Sc II practical Examination	
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2023-2024

Subject – Mathematics **Class** –B.Sc - III

Paper – Metric Space **Month** – January

Name of the teacher: Miss N. G. Nalawade

Date	Unit / Subunit	Teaching Plan
01/01/2024	Theorem : Every open subset G of R^1 can be written as G = U I_n where $I_1, I_2, \ldots$ are a finite number or a countable number of open intervals which are mutually disjoint. Theorem : A function is continuous if and only if inverse image of every open set is open. # Closed sets- Definition: Limit point, closure of a set. Theorem : If E is any subset of the metric space M, then $E \subset \bar{E}$. Definition: Closed set. Theorem : Let E be a subset of the metric space M . Then the point x∈M is a limit point of E if and only if every open ball B[x; r] about x contains at least one point of E	Lecture
02/01/2024	Theorem : Let E be a subset of the metric space M , then E is closed. Theorem : In any metric space < M, ρ > , both M and ∅ are closed sets. Theorem : Arbitrary intersection of closed sets is closed. Theorem : Finite union of closed sets is closed. Theorem :Let G be an open subset of the metric space M . Then G' = M –G is closed. Conversely, if F is a closed subset of M, then F ' = M − F is open.	Lecture
03/01/2024	Theorem : Let $< M_1 ,\rho_1 >$ and $< M_2 ,\rho_2 >$ be metric spaces., and let $f : M_1 \to M_2$. Then f is continuous on M_1 if and only if f^{-1} (F) is a closed subset of M_1 whenever F is a closed subset of M_2. Theorem : Let f be a 1-1 function from a metric space M_1 onto a metric space M_2 . Then if f has any one of the following properties, it has them all. (i) Both f and f^{-1} are continuous (on M_1 and M_2 , respectively). (ii) The set $G \subset M_2$ is open if and only if its image $f(G) \subset M_2$ is open. (iii) The set $F \subset M_1$ is closed if and only if its image f (F) is closed.	Lecture
04/01/2024	# Definition : Homeomorphism, dense subset of a metric space. Show that R^1 and R_d are not homeomorphic. Examples	Lecture and Problem solving
07/01/0002024	UNIT 2- CONNECTEDNESS, COMPLETENESS, COMPACTNESS AND SOME PROPERTIES OF CONTINUOUS FUNCTIONS ON METRIC SPACE # More about open sets . Theorem: Let<M,ϱ> be a metric space and Let A be a proper subset of M. Then the subset G_A of A is an open subset of<A,ϱ> if and only if there exists an open subset G_M of<M,ϱ>such that $G_A = A \cap G_M$.	Revision and Lecture

08/01/2024	Connected sets - Theorem : Let be a metric space Let A be a subset of M . Then if A has either one of the following properties it has the other. (a) It is impossible to find nonempty. subsets A_1 , A_2 of M such that A = $A_1 \cup A_2$, $A_1 \cap A_2 = \emptyset$, $A_1 \cap A_2 = \emptyset$. (b) When <A,ϱ> is itself regarded as metric space , then there is no set expect A an ∅ which is both open and closed in <A,ϱ>.	Lecture
09/01/2024	Definition: Connected set. Theorem : The subset A of R^1 is connected if and only if whenever a∈ A, b∈ A with a < b , then c∈ A for any such that a < c < b. Theorem : A continuous function carries connected sets to connected sets. Theorem : If f is a continuous real valued function on the closed bounded interval [a, b] , then f takes on every value between f (a) an f (b) .	Lecture
10/01/2024	Theorem : A metric space is connected if and only if every continuous characteristic function on it is constant. Theorem : If A_1 an A_2 are connected subsets of a metric space M and if $A_1 \cap A_2 \neq \emptyset$, then $A_1 \cup A_2$ is also connected . Theorem : The interval [0,1] is not connected subset of R_d . # Bounded and totally bounded sets. Definition: Bounded subset of metric space, totally bounded sets. Theorem : Every totally bounded set is bounded. Theorem : A subset A of d R is totally bounded if and if A contains only a finite number of points.	Lecture
11/01/2024	Definition: ε- dense set. Theorem : The subset A of the metric space< M,ϱ> is totally bounded if and only if for every E > 0 , A contains a finite subset $\{x_1,x_2,\ldots x_n\}$ which is ε− dense in A. Theorem : Let<M,ϱ> be a,etric space. The subset A of M is totally bounded if and only if every sequence of points of A contains a cuachy subsequence.	Lecture
12/01/2024	#Complete metric space. Definition: Complete metric space. Theorem: If <M,ϱ> be a complete metric space, and A is a closed subset of M, then <A,ϱ> is also complete. Statement and proof of Generalization of nested interval theorem. Definition: Contraction operator. Theorem : Let < M, ρ> be a complete metric space. If T is a contraction on M , then there is one and only one point x in M such that Tx = x. Theorem: R_d is complete and R^2 is complete. Examples	Lecture and solving examples
13/01/2024	#Compact metric spaces -Definition: Compact metric space. Theorem: The metric space <M,ϱ> is compact if and only if every subsequence of points in M has a subsequence covering to a point in M. Theorem : A closed subset of a compact metric space is closed. Theorem : Every compact metric space of a metric space is closed.	Lecture
14/01/2024	Definition: Covering and open covering . Theorem: If M is a compact metric space, then M has has the Heine- Borel Property .Theorem: If a metric space M has Heine-Borel Property, the M is compact.	Lecture
15/01/2024	Definition: Finite intersection property. Theorem : The metric space M is compact if and only if, whenever F is afamily of closed subsets of M with finite intersection property, then ¿ F∈F F≠ ∅. Theorem : Finite subset of any any metric space is compact .	Lecture

16/01/2024	#Continuous functions on compact metric space. Theorem: Let f be a continuous function of the compact metric space M_1 into a metric space M_2. Then the range f (M_2) of f is also compact. Theorem : Let f be a continuous function of the compact metric space M_1 into a metric space M_2 . Then the range f (M_2) of f is a bounded subset of M_2.	Lecture
17/01/2024	Definition: Bounded function. Theorem: If the real valued function f is continuous on a closed bounded interval in R^1 , then f must be bounded. Theorem : If the real valued function f is continuous on the compact metric space M , then f attains a maximum value at some point of M. Also, f attains a minimum value at some point of M.	Lecture
18/01/2024	Theorem: If the real valued function f is continuous on a closed bounded interval [a,b] , then f attains a maximum and minimum value at some point of [a,b]. Theorem: If f is a continuous real valued function on the compact connected metric space M , then f takes on every value between its minimum value and its maximum value.	Lecture
19/01/2024	Problem solving	Problem solving

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