Credit Based Grading System

Grade	% Marks range (based on absolute marks	Grade Point	Description of performance
A+	**91-100**	**10**	**Outstanding**
A	**81-90**	**9**	**Excellent**
B+	**71-80**	**8**	**Very Good**
B	**61-70**	**7**	**Good**
C+	**51-60**	**6**	**Average**
C	**41-50**	**5**	**Satisfactory**
D	**31-40**	**4**	**Marginal**
F	**30 & below**	**0**	**Fail**
I		**0**	**Incomplete.**
W		**0**	**Withdrawal**

1. The Semester Grade Points Average (SGPA) and Cumulative Grade Point Average (CGPA) shall be calculated as under:

$$\text{SGPA} = \frac{\sum_{i=l}^{n} c_l p_i}{\sum_{i=l}^{n} c_i}$$

Where C_i is the number of credits offered in the i^{th} subject of a Semester for which SGPA is to be calculated, P_i is the corresponding grade point earned I the i^{th} subject, where i = 1,2,……n, are the number of subjects in that semester.

$$\text{CGPA} = \frac{\sum_{i=l}^{n} SGj\, NCj}{\sum_{i=l}^{n} NCj}$$

here NC_j is the number of total credits offered in the j^{th} semester, SG_j is the SGPA earned in the j_{th} semester, where j = 1,2……m, are the number of semesters in that course.

Equivalence of CGPA to division will be on following basis

CGPA Score	Divisions
7.5≤ CGPA	First Division With Honours
6.5 ≤ CGPA < 7.5	First Division
5.0 ≤ CGPA < 6.5	II Division
CGPA<5.0	Fail

The conversion from grade to an equivalent percentage in a given academic program shall be according to the following formula applicable.

Percentage marks scored = $\underline{\text{CGPA}^{\text{Obtained}} \times 100}$

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA101	Advance Abstract Algebra-I	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Normal and subnormal series
Explain the method of application of Solvable and Nilpotent group
Explain the method of application of Algebraic extensions
Explain the method of application of class equation of finite group
Explain the method of application of Polynomial Ring R[x]

Syllabus

Unit-1: Normal and subnormal series of group, composition series of group, Jordan- holder theorem.

Unit-2: Solvable and Nilpotent groups,

Unit-3: Field & subfield definition & Examples, Extension fields, Algebraic extensions, Separable and Inseparable extensions Normal extension, Perfect fields

Unit-4: Class equation of finite group, Cauchy's theorem for finite groups, Sylow Theorem, Wilson's Theorem, Lagrange's Theorem.

Unit-5: Polynomial Ring R[x] over a Ring R in an indeterminate X, Primitive polynomial .The ring of Gaussian integers as an Euclidean domain, Fermat's Theorem, Unique Factorization domain.

Outcome

To be able to understand the method of application of Normal and subnormal series
To be able to understand the method of application of Solvable and Nilpotent group
To be able to understand the method of application of Algebraic extensions
To be able to understand the method of application of class equation of finite group

To be able to understand the method of application of Polynomial Ring R[x]

Recommended text:-

1. S. K. Jain, P. B. Bhattacharya and S. R. Nagpaul, Basic Abstract Algebra, Cambridge University Press (1997).
2. I. N. Herstein, Topics in algebra , wiley Eastern, New Delhi
3. Modern Algebra, by A. R. Vashista, Krishna Prakashan Merrut
4. Advanced Abstract Algebra ; Dr. H.K. Pathak ; Shiksha Sahitya Prakashan, Meerut

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA102	Real Analysis-I	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application Sequence & Subsequences
Explain the method of application of Series of Non-negative terms
Explain the method of application of General Principal of convergence
Explain the method of application of Neighbourhoods, open set and closed set
Explain the method of application of Limit and continuity

Syllabus

Unit-1: Sequences & subsequences, Convergent sequence, divergent sequence and some theorems, Real Valued function & Theorems, Cesaros's Theorem, Nested Interval theorem, Limit superior and Limit Inferior.

Unit-2: Series of Non-negative terms, comparison test, cauchy's condensation test, comparison of ratios, Logarithmic test, D'morgan and bertrand's test.

Unit-3: General Principal of convergence, pringsheims Method, Merten's Theorem, Abel's Theorem, Euler's constant Theorem.

Unit-4: Neighbourhoods, open set and closed set & properties, Bolzano-weierstranss Theorem, Baire category theorem for R, covering Theorem.

Unit-5: Limit and continuity Theorems on continuity, Bolzano's theorem on continuity, continuity of inverse function, Geometrical meaning of a derivative, chain Rule of Derivative, Darboux Theorem and cauchy's mean value Theorems

Outcome

To be able to understand the method of application Sequence & Subsequences
To be able to understand the method of application of Series of Non-negative terms
To be able to understand the method of application of General Principal of convergence
To be able to understand the method of application of Neighbourhoods, open set and closed set
To be able to understand the method of application of Limit and continuity

Recommended text:-

1. Real Analysis, J. N. Sharma and A. R. Vasishtha, Krishna Prakashan media (P) Ltd. Meerut Delhi.
2. Real Analysis, H. K. Pathak, Shiksha Sahitya prakashan.

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA103	Topology-I	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application topological space
Explain the method of application of Neighborhoods, Interiors, exteriors and boundary
Explain the method of application of Continuous Maps
Explain the method of application of Connected space and disconnected spaces
Explain the method of application of compactness, compact subspace

Syllabus

Unit-1: Definition and examples of topological space, Open sets, Closed sets , Closure , Dense subsets.

Unit-2: Neighborhoods, Interiors, exteriors and boundary .Accumulation point and derived sets, bases and sub-bases, subspaces and relative topology.

Unit-3: Continuous Maps, Continuous Maps into R, open and closed maps, Homeomorphism, Finite product spaces, projection maps.

Unit-4: Connected space and disconnected spaces, separated sets, component, locally connected space, Path connectedness, separation axioms : T0, T1 and T2 Spaces.

Unit-5: Introduction of compactness, compact subspace, Finite intersection property, Bolzano-weierstrass property, countable, sequential and local compactness.

Outcome

To be able to understand the method of application topological space
To be able to understand the method of application of Neighborhoods, Interiors, exteriors and boundary
To be able to understand the method of application of Continuous Maps
To be able to understand the method of application of Connected space and disconnected spaces
To be able to understand the method of application of compactness, compact subspace

Recommended Text Books :

1. Introduction to topology and modern analysis by G.F. Simmons , McGraw hill.
2. Introduction to general topology by K. D. Joshi, wiley eastern

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA104	Complex Analysis-I	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application Complex Number
Explain the method of application of Conformal mappings
Explain the method of application of Complex integration
Explain the method of application of Cauchy integral formula
Explain the method of application of Taylor's Theorem, Laurent's Theorem

Syllabus

Unit-I: Complex Number, Analytic Functions, Cauchy – Riemann Equations, Harmonic Functions, Conjugate functions.

Unit-II: Conformal mappings, Bi-linear transformations, Geometrical interpretations of the transformations $\omega = z+\alpha$, $\omega = \beta z$, $\omega = \gamma z$. Bilinear transformation of a circle.

Unit-III: Complex integration, complex integrals as sum of two real line integrals, Cauchy's Theorem, Extension of Cauchy's Theorem to multi – connected region Cauchy.

Unit-IV: Cauchy integral formula, Extension of cauchy's integral formula to multiconnected regions, Liouville's Theorem, Morea's theorem.
Unit-V: Taylor's Theorem, Laurent's Theorem with examples.

Outcome

To be able to understand the method of application Complex Number
To be able to understand the method of application of Conformal mapping
To be able to understand the method of application of Complex integration
To be able to understand the method of application of Cauchy integral formula
To be able to understand the method of application of Taylor's Theorem, Laurent's Theorem

Recommended Text:

1. Functions of a complex variable, By B. S. Tyagi, Kedarnath, Ramnath, Delhi.
2. Functions of a complex variable, B. Conway, Springer.
3. Complex Analysis, T. O. Moore & E. H. Hadlock, Alliel Pub.
4. Complex Functions, J. N. Sharma, Krishna pub.
5. Complex Variable, schaum's outline

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA201	Advance abstract Algebra-II	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application modules

Explain the method of application of Finite generate modules

Explain the method of application of Simple modules

Explain the method of application of Schroeder- Bernstion Theorem, Hillebert basic Theorem, Wedderburn - Artin Theorem,

Explain the method of application of Uniform modules

Syllabus

Unit-1: Introduction to modules- Examples, sub modules, quotient modules. Module homomorphism, isomorphism.

Unit-2; Finite generate modules, Fundamental structure theorem for finitely generated moduls over a principal ideal domain its application of finitely generated abelian group. cyclic modules.

Unit-3: Simple modules, semi simple modules, free modules, Schurs lemma. Neotherian & artinian modules and ring

Unit-4: Schroeder- Bernstion Theorem, Hillebert basic Theorem, Wedderburn - Artin Theorem,

Unit-5: Uniform modules, primary modules, Noether - Laskar Theorem. Fundamental structure theorem of module over a principle ideal domain and its application to finitely generated abelian groups.

Outcome

To be able to understand the method of application modules

To be able to understand the method of application of Finite generate modules

To be able to understand the method of application of Simple modules

To be able to understand the method of application of Schroeder- Bernstion Theorem, Hillebert basic Theorem, Wedderburn - Artin Theorem,

To be able to understand the method of application of Uniform modules

Recommended text :-

1. S. K. Jain, P. B. Bhattacharya and S. R. Nagpaul, Basic Abstract Algebra, Cambridge University Press (1997).

2. I. N. Herstein, Topics in algebra , wiley Eastern, New Delhi

3. Modern Algebra, by A. R. Vashista, Krishna Prakashan Merrut

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA202	Real Analysis-II	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application Riemann-Stieltses Integral & theorems
Explain the method of application of Relation between R- Integral & Rs-Integral
Explain the method of application of Continuity of function of two variables
Explain the method of application of Differentiation of vector-valued function
Explain the method of application of Jacobians

Syllabus

Unit-1: Definition of Riemann-Stieltses Integral & theorems, The Rs-Integral as limit of sums, Some classes of Rs-Integrable function, Algebra of Rs-Integrable function, The Interval of integration, The Rs-Integrability of composite function.

Unit-2: Relation between R- Integral & Rs-Integral, Integration of vector valued function, some more Theorems on integration.

Unit-3: Continuity of function of two variables, Partial Derivatives, Differentiability of two variables, Differentiability of composite function.

Unit-4: Differentiation, Differentiation of vector-valued function, Differentiation in Rn, The implicit function Theorem.

Unit-5: Definition of Jacobians', Case of function of function, Jacobian of implicit functions, Necessary and Sufficient condition for a Jacobian to Vanish Identically.

Outcome

To be able to understand the method of application Riemann-Stieltses Integral & theorems
To be able to understand the method of application of Relation between R- Integral & Rs-Integral
To be able to understand the method of application of Continuity of function of two variables

To be able to understand the method of application of Differentiation of vector-valued function
To be able to understand the method of application of Jacobians

Recommended text:

1. Walter Rudin, Principles of mathematical analysis, McGraw Hill.
2. Real Analysis, J. N. Sharma and A. R. Vasishtha, Krishna Prakashan media (P) Ltd. Meerut Delhi.
3. Real Analysis, H. K. Pathak, Shiksha Sahitya Prakashan.

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA 203	**Topology –II**	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Separation Axioms
Explain the method of application of Countability Axioms
Explain the method of application of Convergence in Topology
Explain the method of application of Metric Spaces and Metrizability
Explain the method of application of Product Spaces

Syllabus

Unit-1: Separation Axioms: Regular and T3 spaces, normal and T4 spaces, Urysohn's Lemma, Tietze's, Extension theorem, completely regular and Tychonoff spaces, completely normal and T5 spaces.
Unit-2: Countability Axioms: First and second axioms of countability, Lindelof spaces , Separable spaces , Coutably compact spaces, Limit point compact spaces.
Unit-3: Convergence in Topology: Sequences and subsequences, convergence in topology, sequential compactness, local compactness, one point compactification, Stone-Cech compactification.
Unit-4: Metric Spaces and Metrizability: Separation and countability axioms in metric spaces, convergence in metric spaces, complete metric spaces.
Unit-5: Product Spaces: Arbitrary product spaces, product invariance of certain separation and countability axioms, Tychonoff's Theorem, product invariance of connectedness.

Outcome

To be able to understand the method of application of Separation Axioms
To be able to understand the method of application of Countability Axioms
To be able to understand the method of application of Convergence in Topology
To be able to understand the method of application of Metric Spaces and Metrizability
To be able to understand the method of application of Product Spaces

Recommended Text Books:

1. Introduction to topology and modern analysis by G.F. Simmons , McGraw hill.
2. Introduction to general topology by K. D. Joshi, wiley eastern

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA204	Complex Analysis-II	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Fundamental theorem of integral calculus for complex functions
Explain the method of application of Residues
Explain the method of application of Evaluation of the integral
Explain the method of application of Fixed points or Invariant points of a Bilinear transformation
Explain the method of application of Analytic, Holomorphic and Regular function

Syllabus

Unit-1: Fundamental theorem of integral calculus for complex functions, uniqueness theorem, The zero of an analytic function, Singularities of an analytic function.

Unit-2: Residues, Cauchy's residue theorem, Evaluation of real definite integrals by contour integration, Integration round the unit circle.

Unit-3: Evaluation of the integral . Evaluation of the integrals of the form , , m>0, where P(x),Q(x) are polynomials,deg Q(x) > deg P(x) Q(x)=0 has no real roots.

Unit-4: Fixed points or Invariant points of a Bilinear transformation, Normal form of a Bilinear transformation, Elliptic, Hyperbolic and parabolic transformations, some special Bilinear transformations.

Unit-5: Analytic, Holomorphic and Regular function, Polar form of Cauchy-Riemann Equations, Derivative of w = f(z) in polar form, orthogonal System, Multiple Valued function.

Outcome

To be able to understand the method of application of Fundamental theorem of integral calculus for complex functions
To be able to understand the method of application of Residues
To be able to understand the method of application of Evaluation of the integral
To be able to understand the method of application of Fixed points or Invariant points of a Bilinear transformation
To be able to understand the method of application of Analytic, Holomorphic and Regular function

Recommended text:

1. John B. Conway, Functions of one complex variable (second edition) Springer Verlag, NewYork (1973).
2. T. O. Moore and E. H. Hadlock, Complex Analysis, Allied Publishers Ltd. (1993).

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA301	Functional Analysis-I	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Normed linear space, Banach spaces
Explain the method of application of Completeness of c^n
Explain the method of application of Sub space and Quotient spaces of Banach space
Explain the method of application of Compactness
Explain the method of application of The conjugate space of L_p ,weak convergence

Syllabus

Unit -1: Normed linear space, Banach spaces examples and theorems ,Holders inequality, Minkowshki's inequality, Cauchy's inequality.

Unit -2: Completeness of c^n , the space l_p^n , completeness of l_p^n ,the space l_p ,Riesz – Fisher theorem.

Unit -3: Sub space and Quotient spaces of Banach space , Narm of Bounded (continuous) linear transformation , basic properties of finite dimensional normed linear space.

Unit -4: Compactness , Equivalent norms ,Riesz –lemma ,Convexity theorem ,the natural imbedding of N in N** ,Reflexivility .

Unit -5: The conjugate space of l_p ,weak convergence , the conjugate of an operator , dual spaces with examples , uniform boundedness theorem .

Outcome

To be able to understand the method of application of Normed linear space, Banach spaces

To be able to understand the method of application of Completeness of c^n

To be able to understand the method of application of Sub space and Quotient spaces of Banach space

To be able to understand the method of application of Compactness

To be able to understand the method of application of The conjugate space of L_p ,weak convergence

Recommended Text

1. P.K. Jain ,O.P. Ahuja and Khalil Ahmad ,Functional Analysis ,New Age International (P) Limited & Wiley Eastern Ltd. New Delhi ,1997.

2. K.K. Jha ,Functional Analysis ,Students Friends ,1986.

3. B.Chaudhary and Sudarshan Nanda , Functional Analysis with applications ,Wiley Eastern Ltd. , 1989

4. Functional analysis by Dr. H.K Pathak: Shiksha Sahitya Prakashan

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA 302	Integral Transform-I	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice.

These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Laplace transform
Explain the method of application of Differential Equations with Constant Coefficients
Explain the method of application of Laplace transform in initial Boundary value problems
Explain the method of application of Dirichlet's condition & Fourierseries
Explain the method of application of Finite Fourier sine transform

Syllabus

Unit –I: Definition and Properties .Sufficient Conditions for the existence of Laplace Transform. Laplace Transform of some elementary functions. Laplace Transform of the derivatives. Inverse of Laplace Transform. Initial and final theorems..Learch's theorem .Heaviside's expansion theorem. Convolution theorem.

Unit-II: Some of ordinary Differential Equations with Constant Coefficients. Solution of ordinary differential equation with variable coefficients. Solution of Simultaneous ordinary differential equation. Solution of Partial differential equations. Application to electrical equations .Application to mechanics. Application of Laplace transform to integral equations.

Unit-III: Application of Laplace transform in initial Boundary value problems.Heat conduction equation.Wave equation.Laplace equation Application to Beams.

Unit-IV: Dirichlet's condition.Fourierseries.Fourierintegralformula,Fouriertransform or complex Fourier transform. Inversion theorem for complex Fourier transform. Fourier Sine and Cosine Transform.

Change of Scale Property, Shifting Property .Modulation theorem. Multiple Fourier transform. Convolution. The Convolution or falting theorem for Fourier transform. Parseval's identity for Fourier transform.

Unit-V: Finite Fourier sine transform. Inversion formula for sine transform. Finite Fourier cosine transform. Inversion formula for cosine transform. Multiple finite Fourier transform theorems on operational properties of finite sine and cosine transform. Combined properties of finite Fourier sine and cosine transform .

Outcome

To be able to understand the method of application of Laplace transform

To be able to understand the method of application of Differential Equations with Constant Coefficients
To be able to understand the method of application of Laplace transform in initial Boundary value problems
To be able to understand the method of application of Dirichlet's condition & Fourierseries
To be able to understand the method of application of Finite Fourier sine transform

Recommended Text

1. I.N.Sneddon : The Uses & integral transform.
2. C.J.Tranter: Integral transform.
3. Tricomi:Integral equations.
4. Dr.ShantiSwarup :Integral transform
5. Goyal & Gupta: Integralk Transform

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA 303	Special Function-I	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Special Functions, Infinite series
Explain the method of application of Hypergeometric Function
Explain the method of application of Introduction of generalized Hypergeometric Function
Explain the method of application of Integrals involving Generalized hypergeometric Functions
Explain the method of application of Generating Function for Jn(z)

Syllabus

UNIT – 1: Special Functions, Infinite series , ortho gonal Polynomials, eulerian definition Weistrass Defination, Eulerian Product rz Evaluation of r(i) and F'(1/2)/ r(1/2) Equivalence of Weierstrass and Euler Defination , Factorial Function Gauss' Multiplication Formula .

UNIT – 2: Hypergeometric Function , Integral Represention of f(a,b ; c,z) Relation of contigulity , Hypergeometric differential equation , transformation of f(a,b ; c,z)

UNIT – 3: Introduction of generalized Hypergeometric Function , Differential Equation Satisfied by pfq , saalsehutz Theorem , whipples Theorem , Dixon's Theorems

UNIT – 4: Integrals involving Generalized hypergeometric Functions, Kummers Theorems, Ramanujans Theorems.

UNIT – 5: Generating Function for Jn(z) , Alternative Form of Generating Function Recurrence relation for Jn(z) , Bessel's integral , Spherical Bessel Functions , Neumann Polynomials & series .

Outcome

To be able to understand the method of application of Special Functions, Infinite series
To be able to understand the method of application of Hypergeometric Function
To be able to understand the method of application of Introduction of generalized Hypergeometric Function
To be able to understand the method of application of Integrals involving Generalized hypergeometric Functions
To be able to understand the method of application of Generating Function for Jn(z)

Recommended Text

1. J.N. Sharma , Special Function , Pragati Prakashan meerut.
2. H.K. Pathak , Special Functions, Shiksha Sahitya Prakashan.

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA 304	Advance Discrete Mathematics	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Algebraic Structures.
Explain the method of application of Semigroup & Monoids .
Explain the method of application of Lattices .

Explain the method of application of Complemented and Distributive Lattices.
Explain the method of application of Trees.

Syllabus

UNIT – 1: Algebraic Structures : Introduction , Algebraic Systems : Examples and Genral Properties : Defination and Examples , Some Simple Algebraic Systems and Genral Properties , Homomorphism and Isomorphism congruence releation .

UNIT – 2: Semigroup & Monoids : Defination & Examples , Homomorphism of semigroups and Monoids

UNIT – 3: Lattices : Lattices as Partially ordered Sets : Defination and Examples , Principale of duality , some Properties of Lattices , Lattices as Algebraic Systems , Sublatttices , Direct Product and Homomorphism.

UNIT – 4: Some special Lattices e.g. complete , Complemented and Distributive Lattices , Boolean Algebra : definition and Examples , Subalgebra , Direct product and Homomorphism , Join irreducible , atoms and antiatoms.

UNIT – 5: Trees : Trees and its properties, minimally connected graphs pendant vertices in a tree, distance and centers in a tree , rooted and binary tree Levels in a binary tree , height of a tree , Spanning tress , rank and Nullity.

Outcome

To be able to understand the method of application of Algebraic Structures.
To be able to understand the method of application of Semigroup & Monoids .
To be able to understand the method of application of Lattices .
To be able to understand the method of application of Complemented and Distributive Lattices.
To be able to understand the method of application of Trees.

Recommended Text

1. J.P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science , McGraw-Hill Book Co. 1997 (for units I ,II and III)
2. Dr. H.K. Pathak : Advance discrete Mathematics , Shikasha Sahitya Prakashan Meerut .

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AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA 401	Functional Analysis-II	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Open mapping theorem ,Closed graph theorem , Hahn –Banach theorem for linear spaces

Explain the method of application of Inner product spaces

Explain the method of application of Orthogonal complements

Explain the method of application of the conjugate space H*

Explain the method of application of the Adjoint of an Oprtator

Syllabus

Unit -1: Open mapping theorem ,Closed graph theorem , Hahn –Banach theorem for linear spaces .

Unit -2: Inner product spaces , Hilbert spaces , some properties of Hilbert spaces ,Schwarz inequality.

Unit -3: Orthogal complements , projection theorem , Ortthonarmel sets , Bessel's inequality ,complete Orthonarmal set .

Unit -4: The conjugate space H* ,Riesz representation theorem for continuous linear functional on a Hilbert space .

Unit -5: The Adjoint of an Oprtator , self adjoint operator ,Normal and operators.

Outcome

To be able to understand the method of application of Open mapping theorem ,Closed graph theorem , Hahn – Banach theorem for linear spaces
To be able to understand of application of Inner product spaces
To be able to understand the method of application of Orthogonal complements
To be able to understand the method of application of the conjugate space H*
To be able to understand the method of application of the Adjoint of an Oprtator

Recommended Text

1. P.K. Jain ,O.P. Ahuja and Khalil Ahmad ,Functional Analysis ,New Age International (P) Limited & Wiley Eastern Ltd. New Delhi ,1997.
2. K.K. Jha ,Functional Analysis ,Students Friends ,1986.
3. B.Chaudhary and Sudarshan Nanda ,Functional Analysis with applications ,Wiley Eastern Ltd. ,1989.
4. H.K Pathak Shiksha Sahitya Prakashan Functional Analysis

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA 402	Integral Transform-II	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Fourier transform in initial and boundary value problems
Explain the method of application of Hankel transform
Explain the method of application of Hankel transform of(d^2 f)/⟦ dx⟧ ^2 +1/x df/dx-n^2/x^(2)f
Explain the method of application of Hankel transform of(d^2 f)/⟦ dx⟧ ^2 +1/x df/dx
Explain the method of application of Mellin transforms

Syllabus

Unit-I: Application of Fourier transform in initial and boundary value problems: Application of infinite Fourier transform. Choice of infinite sine or cosine transforms. Applications of finite Fourier transform. Finite Fourier transform of partial derivatives.

Unit-II: Definition of Hankel transform. Inversion formula for the Hankel transforms. Some important results for Bessel functions. Linearity property. Hankel transform of the Derivatives of a Function.

Unit-III: Hankel transform of(d^2 f)/⟦ dx⟧ ^2 +1/x df/dx-n^2/x^(2) f. Parseval's Theorem .Definition of finite Hankel transform. Another form ofHankel transform.Hankel transform ofdf/dx.

Unit-IV: Hankel transform ofof(d^2 f)/⟦ dx⟧ ^2 +1/x df/dx,where p is the root of the equationJ_n (ap) =0.Applications of HankelTransform in initial and boundary value problems.

Unit-V: Definition of Mellin transforms. The Mellin Inversion theorem. Linearity property. Some elementary properties &Mellin transform.Mellin transform of derivatives. Mellin transform of integrals. Convolution (or falting).

Outcome

To be able to understand the method of application of Fourier transform in initial and boundary value problems
To be able to understand the method of application of Hankel transform
To be able to understand the method of application of Hankel transform of(d^2 f)/⟦ dx⟧ ^2 +1/x df/dx-n^2/x^(2)f
To be able to understand the method of application of Hankel transform of(d^2 f)/⟦ dx⟧ ^2 +1/x df/dx
To be able to understand the method of application of Mellin transforms

Recommended Text

1. I.N.Sneddon : The Uses & integral transform.
2. C.J.Tranter: Integral transform.
3. Tricomi:Integral equations.
4. Dr.ShantiSwarup : Goyal & Gupta Integral Transforms.

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA 403	Special Function-II	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Hermit Polynomials solution of Hermites differential equation
Explain the method of application of Bateman's Generating Relation
Explain the method of application of Laguerre Polynomials Solution of Laguerres differentials Equation
Explain the method of application of Generlised Laguerre Polynomial
Explain the method of application of Jacobi Polynomials

Syllabus

UNIT – 1: Introduction of Hermit Polynomials solution of Hermites differential equation , Generating Function of Hermites Polynomials Rodrigues Formula for Hn(x), Recurrence relations for Hn(x)

UNIT – 2: Bateman's Generating Relation Integral Representation of Hermite Polynomial ortnagonal Properties of Hn(x) , Expansions of Polynomials .

UNIT – 3: Introduction of Laguerre Polynomials Solution of Laguerres differentials , Equation , Generating Function of Laguerre Polynomilas , Rodrigues Formula, Recurrence Releations of Rodrigues Formula .

UNIT – 4; Generlised Laguerre Polynomial ,Recurrence Releation .

UNIT – 5; Introduction of Jacobi Polynomials, Generating Functions of Jacobi Functions Rodrigues Formula , Orthogonal Properties Recurrence Releation .

Outcome

To be able to understand the method of application of Hermit Polynomials solution of Hermites differential equation

To be able to understand the method of application of Bateman's Generating Relation

To be able to understand the method of application of Laguerre Polynomials Solution of Laguerres differentials Equation

To be able to understand the method of application of Generlised Laguerre Polynomial

To be able to understand the method of application of Jacobi Polynomials

Recommended Text

1. J.N. Sharma , Special Function , Pragati Prakashan meerut.
2. H.K. Pathak , Special Functions, Shrilesha Sahitya Prakashan.

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Scheme of Examination

Department: Mathematics

Subject Code	Subject Name	Credits	Maximum marks Allotted						Duration of Exam.	
			Theory			Practical		Total	Theory	Practical
			Major	Minor	Sessional.	End Sem	Lab Work			
SMMA 404	Operation Research	4(3+1+0)	50	20	30	-	-	100	3 hr	-

Pattern:

The question paper will consist of six questions. Question no. 1 will have 10 objective type questions of 10 marks, covering entire syllabus. Objective questions should have right mix of questions to test the logic, problem solving skill and reasoning. Each objective question should have four choices to pick up from. Remaining five questions will carry 08 marks each, one from each of the five units of the syllabus and may have internal choice. These five questions will have two parts A & B, preferably one theoretical and other numerical. Questions should test the concepts, knowledge and application. Candidates are required to answer all the questions.

Objective

Explain the method of application of Operation research and its Scope
Explain the method of application of Algorithms for Linear Programming
Explain the method of application of Transportation and Assignment Problems.
Explain the method of application of Networks Analysis
Explain the method of application of Dynamic Programming

Syllabus

UNIT – 1: Operation research and its Scope , Necessity of Operation Research in Industry , Linear Programming – Simplex Method, theory of the Simplex Method , Duality and Sensitivity Analysis .

UNIT – 2: Algorithms for Linear Programming- Dual Simplex Method , Parametric Linear Programming , Upper – Bound Technique , Interior Point Algorithm, Linear Goal Programming.

UNIT – 3: Transportation and Assignment Problems.

UNIT – 4: Networks Analysis – Shortest Path Problem , Minimum Spanning Tree Problem , Maximum Flow Problem , Minimum cost Flow Problem , Network Simplex Method , Project Planning.

UNIT – 5: Dynamic Programming-Deterministic and Probabilistc Dynamic Programming

Recommended Text

1. Kanti swarup , P.K. Gupta and Man Mohan ; Operation Research , Sultan Chand & Sons , New Delhi
2. G. Hadley , Linear Programming , Narosa Publishing House , 1995

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