



**College of Agricultural Engineering & Technology  
Anand Agricultural University  
Godhra – 389 001**

**Revision of Courses of Mathematics for  
Polytechnic in Agricultural Engineering**

**Read:** Minutes of the 58<sup>th</sup> Meeting of the Academic Council vide no. AAU/Reg/Acad(Mect-58)/A.139/7550-7579/2022, dated:-12/08/2022


**NOTIFICATION**

It is hereby notified to all concerned that vide item no 58.21 in the minutes of the 58<sup>th</sup> meeting of the academic council of the Anand Agricultural university held on 29/07/2022, the council has resolved as under;

**“Academic Council based on the recommendation of the board of studies and the faculty board, resolves to adopt the revised syllabus of Mathematics courses for implementation in Polytechnic in Agricultural Engineering as appended in APPENDIX-I from the Academic Year 2022-23.”**

No: -AAU/CAET/Acad/2022-23-32 /2022

Date: - 22 / 08 /2022

  
(Dr. R. Subbaiah)  
Dean & Principal

College of Agril. Engg. & Tech.

**Copy F.W.Cs. to:**

1. PS to Hon'ble Vice-chancellor, Anand Agricultural University, Anand
2. State Agricultural University Council, Gandhinagar
3. All the members of the Academic Council of the University
4. All officers of Anand Agricultural University, Anand
5. The Registrar, AAU, Anand
6. All the HODs of this college
7. Academic Branch of this college

## Minutes of the meeting of committee for revising the syllabus of Mathematics course of Diploma in Agricultural Engineering

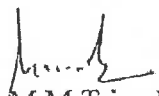
Minutes of the meeting of the Principal's & concerned faculties of Agricultural Engineering of SAUs' of Gujarat constituted for revising and updating the syllabus of mathematics courses for Diploma in Agricultural Engineering. The existing syllabus of mathematics courses need to be revised keeping in view the suggestions of the concerned faculties for better understanding of the subject and synchronization with B.Tech.(Agril.Engg.) course. The meeting was held on 06/07/2022 through online mode on 10.30 am at PAE,AAU,Dahod.

The following members have attended the online meeting

Sr. No	Name	Designation
1	Dr.M.M.Trivedi	Principal and Chairman, PAE,AAU,Dahod
2	Dr.R.M.Satasiya	Principal,PAE, Targadiya (JAU)
3	Dr.Arun Lakkad	Principi, PAE, Dediya pada (NAU)
4	Prof.Hetal Tanna	Asstt. Prof.CAET,AAU,Godhra
5	Prof.Meghana Verma	Asstt. Prof.PAE, Dediya pada (NAU)
6	Prof.D.P.Sanepara	Asstt. Prof., PAE, Targadiya (JAU)
7	Prof.Sachin S. Chinchorkar	Academic In-charge & Asstt.Prof, PAE,AAU,Dahod

Dr. M.M.Trivedi, Chairman and Principal, PAE,AAU,Dahod of the committee welcomed all the members and explained the purpose and need of the meeting. All the members of polytechnic in Agricultural Engineering of SAU's i.e. AAU, Dahod, JAU, Targadiya and PAE, Dediya pada have expressed their views, thoroughly discussed at length and necessary suggestions/modifications are called from the members and required to submit the same at an earliest. Finally the courses and their contents are appended as Appendix-II.

The members were made consent to take all necessary procedure and action required for adopting the above revised mathematics courses from the Academic Year 2022-23. The meeting was ended with the vote of thanks by Mr. S.S.Chinchorkar, Assistant Professor, PAE,AAU,Dahod.



Dr.M.M.Trivedi  
Chairman and Principal,  
PAE,AAU,Dahod

No.AAU/PAE/Acad/ 276-81/2022, Dahod      Dated: 06/07/2022

*c.f.w.r. to:*

1. The Registrar, AAU,Anand
2. The Principal and Dean, CAET,AAU,Godhra/Junagadh/Dediya pada
3. The Principal, PAE,AAU,Dahod/Targadiya(Rajkot)/NAU, Dediya pada (Dist. Narmada)

## First Semester

HBS – 1.1.2      Applied Mathematics      Credit – 4 (4+0)

### Theory

1.    **Function** : Definition and concept of function, Examples
2.    **Co-ordinate Geometry**:
  - 2.1 **Point & Triangle** : Distance formula, Mid-point, Area and Centroid of a triangle, Locus of a point
  - 2.2 **Straight Line** : Forms of equation of straight lines : Slope point form, Two point form, Intercept form, Parallel and Perpendicular lines
  - 2.3 **Circle**: Equation of Circle, Centre and radius form, Tangent and Normal and related problems.
3.    **Limit**: Concept of limit, Standard formulae & working rules of limits and related example
4.    **Permutations and Combinations**: Value of  ${}_nP_r$  and  ${}_nC_r$ , its properties and simple problems
5.    **Binomial theorem**: Binomial theorem (without proof) for positive integral index (expansion and general term); Binomial theorem for any index (expansion only) first and second binomial approximation with application to engineering problems.
6.    **Logarithm**: General properties & Rules of logarithms, Calculations of engineering problems using logtables
7.    **Trigonometry**: Units of angles (degree and radian), Allied & Compound angles, Addition and Subtraction formulae, Multiple and Sub-multiple angles, Graph of Sine and Cosine, Periodic function, Sum and Factor formulae, Inverse trigonometric function, Solution of triangles.
8.    **Complex Numbers**: Definition, Real and Imaginary parts of a complex number, Polar and Cartesian representation of a complex number and conversion from one form to the other, Conjugate of a complex number, modulus and argument of a complex number, Addition, subtraction, multiplication and division of a complex number.

### RECOMMENDED BOOKS

1.    Applied Mathematics Vol. I by SS Sabharwal and Others by Eagle Prakashan, Jalandhar
2.    Applied Mathematics Vol. II by SS Sabharwal and Others by Eagle Prakashan, Jalandhar
3.    Engineering Mathematics Vol. I by Ishan Publishing House
4.    Engineering Mathematics Vol. I by S Kohli and Others; IPH, Jalandhar
5.    Engineering Mathematics by Dass Gupta
6.    Advanced Engineering Mathematics by AB Mathur and VP Jagi; Khanna Publishers, Delhi
7.    Higher Engineering Mathematics by BS Grewal; Khanna Publishers, Delhi
8.    Engineering Mathematics by C Dass Chawla; Asian Publishers, New Delhi
9.    NCERT 11<sup>th</sup> and 12<sup>th</sup> science Mathematics book

## Second Semester

HBS-1.2.2

Engineering Mathematics – I

Credit – 3 (2+1\*)

### Theory

1. **Determinants and Matrices:** Expansion of determinants (upto third order) using Sarrus rule, Expansion method and pivotal's condensation method. Properties of determinants, Solution of equations (upto 3 unknowns) by Cramer's rule. Definition of matrix, addition, subtraction and multiplication of matrices (upto third order). Inverse of a matrix by adjoint method, Solution of equations (up to 3 unknowns) by Matrix method
2. **Differentiation:** Definition Rules of Sum, Product & Quotient of Functions, Chain Rule, Derivative of Implicit functions and Parametric functions, Logarithmic differentiation. Successive differentiation up to second order, Example related application of derivatives.
3. **Integration and Integral calculus:** Concept, Integral of standard functions, Working rules of integration, Integration by parts, Integration by substitution method, Integration by partial fraction method, Definite Integral and its properties; Application of definite integral to find area, Double and triple integrals, Volume and surface revolution curves.
4. **Vectors and vector calculus:** Definition of vector and scalar quantities. Addition and subtraction of vectors. Dot product and Cross product of two vectors. Thumb rule. Angle between two vectors, Application of dot and cross product in engineering problems, Scalar triple product and vector triple product, Differentiation of vectors, scalar and vector point functions, Gradient of a scalar point function, Divergence and Curl of a vector point function, Integration of vector function (Line, Surface and Volume integrals)

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1. Applied Mathematics Vol. I by SS Sabharwal and Others by Eagle Prakashan, Jalandhar
2. Applied Mathematics Vol. II by SS Sabharwal and Others by Eagle Prakashan, Jalandhar
3. Engineering Mathematics Vol. I by Ishan Publishing House
4. Engineering Mathematics Vol. I by S Kohli and Others; IPH, Jalandhar
5. Engineering Mathematics by Dass Gupta
6. Advanced Engineering Mathematics by AB Mathur and VP Jagi; Khanna Publishers, Delhi
7. Higher Engineering Mathematics by BS Grewal; Khanna Publishers, Delhi
8. Engineering Mathematics by C Dass Chawla; Asian Publishers, New Delhi
9. NCERT 11th and 12th science Mathematics book

## Third Semester

HBS-2.1.1

Engineering Mathematics-II

Credits - 3 (2 + 1\*)

### Course content :

**Differential calculus:** Taylor's and Maclaurin's expansions; indeterminate form; function of two or more independent variables, Partial differentiation, Homogeneous functions and Euler's theorem, Composite functions, Total derivatives, Change of variables, Jacobians, error evaluation, Maxima and Minima.

**Ordinary Differential equations:** Formation of ordinary differential equations Exact and Bernoulli's differential equations, Equations reducible to exact form by integrating factors, Equations of first order and higher degree, Clairaut's equation, Differential equations of higher order.

**Partial Differential Equations:** Formation of partial differential equations, Lagrange's linear equation, Solution of non-linear partial differential equations, Charpit's method

**Matrices:** Elementary transformation, Rank of a matrix, Reduction to normal form, Gauss-Jordan method to find inverse of a matrix, Consistency and solution of linear equations, Eigen values and eigen vectors, Linear transformation, Cayley-Hamilton theorem.

**Functions of a Complex Variable:** Limit, Continuity and derivative of complex functions, Analytic function, Cauchy-Reimann equations, Conjugate functions, Harmonic functions.

**Fourier Series:** Infinite series and its convergence, Periodic functions, Fourier series, Euler's formulae, Dirichlet's conditions, Functions having arbitrary period, Even and odd functions, Half range series, Harmonic analysis.

### Reference Books

- Higher Engineering Mathematics, Vol-I,II , By: Dr. K. R. Kachot
- A Text book of Practical Mathematics Vol-I,II, By: I. B. Prasad
- Higher Engineering Mathematics, By: Dr. B. S. Grawal
- A Text Book of Engineering Mathematics, By: N. P. Bali and Ashok Saxena
- Schaum's Outline Series: Theory and Problems of Vector analysis, By: Murray R. Spigel
- Schaum's Outline Series: Theory and Problems of Advance Calculus, By: Murray R. Spigel
- Advance Engineering Mathematics , By: Erwin Kreyszing