BLOW UP SYLLABUS
AV Mathematics-III for EC Engineering
(BMATEC301)
(Effective from the academic year 2023-24)

Topics	Topics To be Covered	Hours
Module-1: Fourier series and practical harmonic analysis		
Periodic functions, Dirichlet's condition. Fourier series expansion of functions with period 2π and with arbitrary period: periodic rectangular wave, Half–wave rectifier, rectangular pulse, Saw tooth wave.	Discussion and coverage of contents as suggested in Articles No. 10.1 to 10.6 and 10.8 of Textbook 1.	**3L**
Half-range Fourier series. Triangle and its half-range expansions, Practical harmonic analysis, variation of periodic current, Forced oscillations.	Discussion and coverage of contents as suggested in Articles No. 10.7 and 10.11 of Textbook 1 and 11.3 of Textbook 2.	**3L**
(RBT Levels: L1, L2 and L3)		
Tutorials	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. applications by the Faculty, about the module.	**2T**
	Total	**8**
Module-2: Infinite Fourier Transforms		
Infinite Fourier transforms, Fourier cosine and sine transforms, Inverse Fourier transforms, Inverse Fourier cosine and sine transforms	Discussion and coverage of contents as suggested in Articles 22.1, 22.4, and 22.5 of Textbook 1.	**3L**
Discrete Fourier transform (DFT), Fast Fourier transform (FFT).	Discussion and coverage of contents as suggested in Articles No.11.9 of Textbook 2. (problems restricted to the articles)	**3L**
(RBT Levels: L1, L2 and L3)		
Tutorials	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. Applications by the faculty, about the module.	**2T**
	Total	**8**
Module-3: Z Transforms		

Definition, Z-transforms of basic sequences and standard functions. Properties: Linearity, scaling, first and second shifting, multiplication by n.	Discussion and coverage of contents as suggested in Articles No.23.1 to 23.8 of Textbook 1.	**3L**
Initial and final value theorem. Inverse Z-Transforms. Application to difference equations.	Discussion and coverage of contents as suggested in Articles No.23.9 to 23.11, 23.15 (II), and 23.16 of Textbook 1. (problems restricted to the articles)	**3L**
(RBT Levels: L1, L2 and L3)		
Tutorials	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. Applications by the faculty, about the module.	**2T**
	Total	**8**

Module-4: Ordinary Differential Equations of Higher Order

Higher-order linear ODEs with constant coefficients - Inverse differential operator, problems	Discussion and coverage of contents as suggested in articles No. 13.1, 13.2(Proof of the theorem is excluded), 13.3, 13.4 and 13.6 (Cases I, II, III only) of Textbook 1 (*P.I.* Restricted to $R(x) = e^{ax},\ sinax/cosax$, x^m for $f(D)y = R(x)$.	**3L**
Linear differential equations with variable Coefficients-Cauchy's and Legendre's differential equations‑Problems. Application of linear differential equations to L-C circuit and L-C-R circuit.	Discussion of problems in Article No. 13.9 of Textbook-1 *(P.I. Restricted to $R(X) = e^{ax},\ sinax/cosax, x^n$* & log x for f(D)y = R(x)) for Cauchy's and Legendre's equations). Discussion of Problems 14.5 of Textbook 1	**3L**
(RBT Levels: L1, L2 and L3)		
Tutorials	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. Applications by the faculty, about the module.	**2T**
	Total	**8**

Module-5: Curve fitting, Correlation, and Regressions

Principles of least squares, Curve fitting by the method of least squares in the form $y = a + bx, y = a + bx + cx^2$, and $y = ax^b$.	Discussion and coverage of contents Articles no. 24.1, and 24.4. Discussion of problems Article No. 24.5, and 24.6(1) of Textbook 1	**3L**
Correlation, Coefficient of correlation, Lines of regression, Angle between regression lines, standard error of estimate, rank correlation.	Discussion and coverage of contents in Articles No.25.12 to 25.16 of Textbook 1.	**3L**
(RBT Levels: L1, L2 & L3)		

Tutorials	Involvement of faculty and students in identifying the problems & solutions, PPT presentations of Engg. Applications by the faculty, about the module.	**2T**
	Total	**8**

Text Books:-
1. B.S. Grewal, **"Higher Engineering Mathematics",** Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig, **"Advanced Engineering Mathematics",** John Wiley & Sons, 10th Ed.(Reprint), 2016.

Reference Books:-
1. C. Ray Wylie, Louis C. Barrett, **"Advanced Engineering Mathematics",** 6th Edition, McGraw-Hill Book Co., New York, 1995.
2. James Stewart, **"Calculus –Early Transcendentals"**, Cengage Learning India Private Ltd., 2017.
3. B. V. Ramana, **"Higher Engineering Mathematics"**, 11th Edition, Tata McGraw-Hill, 2010.
4. Srimanta Pal & Subobh C Bhunia, **"Engineering Mathematics"**, Oxford University Press, 3rd Reprint, 2016.
5. Gupta C.B., Singh S.R. and Mukesh Kumar, **"Engineering Mathematics for Semester I & II",** Mc-Graw Hill Education (India) Pvt. Ltd., 2015.

Web links and Video Lectures:
1. http://nptel.ac.in/courses.php?disciplineID=111
2. http://www.class-central.com/subject/math(MOOCs)
3. http://academicearth.org/
4. VTU EDUSAT PROGRAMME - 20