ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

VI SEMESTER **MATHEMATICS** **TIME: 5 Hrs / Week**

M 6301 – A-3(4)
w.e.f. 2017-2018

Cluster Elective - VIII-A-3 : SPECIAL FUNCTIONS Max. Marks: 100

SYLLABUS

OBJECTIVES : To enable the students to

- Know and understand the problems and identities
- Apply the principles in engineering, physics and other Allied Sciences
- Synthesize the knowledge to formulate conclusions
- Apply the theories in every branch of science and also in commerece and Management Systems.

COURSE

UNIT – I :

Beta and Gamma Functions : Euler's Integrals – Beta and Gamma Functions, Elementary Properties of Gamma Functions, Transformation of Gamma functions, Another form of Beta functions, Relation between Beta and Gamma functions, Other transformations, Legendre Duplication Formula

UNIT – II :

(a) Legendre's Equation : Definition of Legendre's equation, Definitions of $P_n(x)$ and $Q_n(x)$,To show that $P_n(x)$ is the coefficient of h^n in the expansion in ascending powers of $(1-2xh+h^2)^{-1\backslash 2}$, Laplace definite integral for $P_n(x)$, Orthogonal properties of Legendre's Polynomials ,Recurrence formulae, Beltrami's results, Christoffer's summation Formula , Rodrigue's Formula .

(b) Lagurre Polynomials: Laguerr's Differential Equation, Lagurre Polynomials, Generating Function, other forms for the Laguerre Polynomials(Rodrigues Formula). To find first few Laguerre Polynomials, Orthogonal Property of the Laguerre Polynomials. Recurrence formulae for Laguerre Polynomials.

UNIT-III:

Hermite Polynomials: Hermite Differential Equation , Hermite Polynomials, Generating Function, Other forms for the Hermite Polynomials, To find first few Hermite Polynomials, Orthogonal Properties of Hermite Polynomials, Recurrence formulae for Hermite Polynomials.

UNIT-IV :

Bessel's equation , General Solution of Bessel's equation . Definition of $J_o(X)$,Recurrence Formulae for $J_n(X)$.

Prescribed Text Book : Special functions – J..N..Sharma and R..K..Gupta, Krishna Prakashan Media(P) Ltd.Meerut (2006)

REFFERENCE BOOKS:

1. Special Functions - E.D.Rain Ville (2006)

2. Special Functions – N.Saran(2002)

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

VI SEMESTER **MATHEMATICS** **TIME: 1 Hr / Week**

M 6351 – A-3(1)
w.e.f. 2017 - 2018

Cluster Elective - VIII-A-3 : SPECIAL FUNCTIONS **Max. Marks: 50**

PRACTICAL SYLLABUS

OBJECTIVES : To enable the students to

- Know and understand the problems and identities
- Apply the principles in engineering, physics and other Allied Sciences
- Synthesize the knowledge to formulate conclusions
- Apply the theories in every branch of science and also in commerece and Management Systems.

COURSE

UNIT – I :

Beta and Gamma Functions : Euler's Integrals – Beta and Gamma Functions, Elementary Properties of Gamma Functions, Transformation of Gamma functions, Another form of Beta functions, Relation between Beta and Gamma functions, Other transformations, Legendre Duplication Formula

UNIT – II :

(a) Legendre's Equation : Definition of Legendre's equation, Definitions of $P_n(x)$ and $Q_n(x)$,To show that $P_n(x)$ is the coefficient of h^n in the expansion in ascending powers of $(1-2xh+h^2)^{-1\backslash 2}$, Laplace definite integral for $P_n(x)$, Orthogonal properties of Legendre's Polynomials ,Recurrence formulae, Beltrami's results, Christoffer's summation Formula , Rodrigue's Formula .

(b) Lagurre Polynomials: Laguerr's Differential Equation, Lagurre Polynomials, Generating Function, other forms for the Laguerre Polynomials(Rodrigues Formula). To find first few Laguerre Polynomials, Orthogonal Property of the Laguerre Polynomials. Recurrence formulae for Laguerre Polynomials.

UNIT-III:

Hermite Polynomials: Hermite Differential Equation , Hermite Polynomials, Generating Function, Other forms for the Hermite Polynomials, To find first few Hermite Polynomials, Orthogonal Properties of Hermite Polynomials, Recurrence formulae for Hermite Polynomials.

UNIT-IV :

Bessel's equation , General Solution of Bessel's equation . Definition of $J_o(X)$,Recurrence Formulae for $J_n(X)$.

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