## **Course Objective:**

The objective of the course is to study some important special functions and thereby to study a variety of different methods for discovering the properties of such functions.

				3	pecial Fun	ctions (18B	SM 506)			
	Те	eachin	g Sch	ieme		Examination Scheme				
L	T	Р	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1		4	4	25	50	25			100
I	U <b>NIT</b> Orc		and s	ingular points	: Definition	s, Series sol	utions of d	ifferential	equations: F	<b>9 hours</b> Power
	seri	es sol	ution	in powers of (	$(x - x_0)$ . Se	ries solution	about regu	ılar singul	ar point $x =$	0,
	Fro	beniu	s metl	hod						
			5 met	iou.						
I	UNIT	II								10 hours
	<mark>Be</mark>	ssel e	quatic	n and its solut	tion, Bessel	function of	first and se	cond kind	l of order <i>n</i> .	
	Re	currer	nce re	lations, Genera	ating functi	on, Orthogo	nalityof Be	essel's fun	ction.	
					C		2			401
	UNIT	111								10 hours
	Le	gendro	e equa	ation and its so	lution. Leg	endre's poly	ynomial of	degree <i>n</i> .	Recurrence 1	elations,
	ort	hogon	al pro	operties of Leg	gendre's pol	lynomial.Ro	drigue's fo	rmula. Lo	egendre's po	lynomial
	of	secon	d kind	<mark>].</mark>						
	01	500011		**						
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										10 hours
	He	• ,	D 1	· 1 T	D 1	. 1 . 1 . 01		• •	1.4 * .4	10 hours
		rmite	Polyr	nomial, Laguer	rre Polynon	nial and Che	byshev pol	ynomial a	nd their orth	
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Course Outcomes: After completion of this course, student will be able to

- **4** Understand the infinite product and properties of Beta and Gamma functions
- **4** Analyze the properties of Hypergeometric functions.
- Perform operations with Bessel, Hermite and Legendre differential equations along with the corresponding recurrence formulas of different functions.
- Demonstrate their understanding of how physical phenomena are modeled using special functions.
- **Explain the applications and the usefulness of special functions.**