

# **Walchand College of Engineering, Sangli**

(An Autonomous Institute)



## **Curriculum (Structure)**

**for**

**M. Tech. in Electrical**

**(Control System Engineering)**

**With Effect From**

**Academic Year**

**2018-2019 (F. Y. M. Tech.)**

**2019-2020 (S. Y. M. Tech.)**

**Walchand College of Engineering, Sangli**

(An Autonomous Institute)

Teaching and Evaluation Scheme

**First year M. Tech. Program in Electrical (Control System Engineering)**

Semester I

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
MC	3CS501	Research Methodology for Electrical Engineers	2	-	-	2	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3CS502	Applied Digital Control	3	-	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3CS503	Process Control	3	-	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PE	3CS5**	Professional Elective 1	3	-	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PE	3CS5**	Professional Elective 2	3	1	-	4	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3CS551	Applied Digital Control Laboratory	--	--	2	1	ISE	50	20	
							ESE	50	20	
PC	3CS552	Process Control Laboratory	--	--	2	1	ISE	50	20	
							ESE	50	20	
PE	3CS5**	Professional Elective Laboratory 1	--	--	2	1	ISE	50	20	
							ESE	50	20	
Total			14	1	6	18	<b>Total Credits: 18 Total Contact Hrs: 21</b>			

Professional Elective 1			Professional Elective 2	
3CS511	CS561	Optimal Control	3CS513	System Identification
3CS512	3CS562	Multivariable Control	3CS514	Advanced Digital Signal Processing

**Walchand College of Engineering, Sangli**  
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Teaching and Evaluation Scheme  
**First year M. Tech. Program in Electrical (Control System Engineering)**  
Semester II

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
OE	3OE5**	Open Elective	3	--	--	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3CS521	Adaptive Control	3	1	--	4	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3CS522	Robust Control	3	--	--	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PE	3CS5**	Professional Elective 3	3	--	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PE	3CS5**	Professional Elective 4	3	--	--	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3CS571	Robust Control Laboratory	--	--	2	1	ISE	50	20	
							ESE	50	20	
PE	3CS5**	Professional Elective 3 Laboratory	--	--	2	1	ISE	50	20	
							ESE	50	20	
PE	3CS5**	Professional Elective 4 Laboratory	--	--	2	1	ISE	50	20	
							ESE	50	20	
PC	3CS541	Pre-dissertation work and seminar	--	--	4	2	ISE	100	40	
Total			15	1	10	21	<b>Total Credits: 21 Total Contact Hrs: 26</b>			

<b>Professional Elective 3</b>		
3CS531	3CS581	Non-linear Dynamical Systems
3CS532	3CS582	Real Time Control Applications
<b>Professional Elective 4</b>		
3CS533	3CS583	Intelligent Control
3CS534	3CS584	PLC and Embedded Control

<b>Open Elective</b>		
Course Code	Course Name	Offered by Department
3OE501	Design Optimization	Applied Mechanics
3OE502	Structural Health Monitoring and Smart Materials	
3OE515	Life Cycle Assessment and Ecolabelling	Civil Engineering
3OE516	Construction Equipment	
3OE529	Business Analytics	Mechanical Engineering
3OE530	Industrial Safety	
3OE531	Operations Research	
3OE532	Cost Management of Engineering Projects	
3OE533	Composite Materials	
3OE534	Waste to Energy.	
3OE535	Project Based Learning with Embedded System	
3OE543	Control Techniques for Electrical Drives.	Electrical Engineering
3OE544	Neural Network and Fuzzy Control.	
3OE557	Remote sensing and Image Analysis	Electronics Engineering
3OE558	Automotive Electronics	
3OE559	Mechatronics	
3OE560	Digital Image processing	
3OE561	Nano materials and Nano-technology	
3OE562	Numerical Methods for Engineers	
3OE563	Optimization Techniques	
3OE571	Business Intelligence	Computer Science and Engineering
3OE 572	Cyber Security	
3OE585	Geographic Information Systems	Information Technology
3OE586	Data Visualization & Interpretation	
3OE587	Computational Engineering using Python	
3OE588	3D Modeling, Animation and Computer Simulation	

**Walchand College of Engineering, Sangli**

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Teaching and Evaluation Scheme

**Second year M. Tech. Program in Electrical (Control System Engineering)**

Semester I

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
PE	3CS6**	Professional Elective 5	3	-	-	3	ISE 1	10		40
							MSE	30		
							ISE 2	10		
							ESE	50	20	
PC	3CS690	Dissertation phase I	-	-	5	4	ISE	100	40	
	3CS691	Dissertation phase II				2	ISE	100	40	
						4	ESE	100	40	
MC	3IC6**	Mandatory Non Credit Course	2	-	-	-	ISE 1	35	40	
							MSE	30		
							ISE 2	35		
Total			5	-	5	13	<b>Total Credits: 13 Total Contact Hrs: 10</b>			

**Semester II**

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
PC	3CS692	Dissertation phase III	-	-	5	4	ISE 3	100	40	
	3CS693	Dissertation phase IV				4	ISE 4	100	40	
						8	ESE 2	100	40	
MC	3IC6**	Mandatory Non Credit Course				-	ISE 1	35	40	
							MSE	30		
							ISE 2	35		
Total			2	-	5	16	<b>Total Credits: 16 Total Contact Hrs: 7</b>			

<b>Professional Elective 4</b>	
3CS611	Modern Power Electronics
3CS612	Robotics and AI

<b>List of Mandatory Non Credit Course</b>	
3IC601	Constitution of India
3IC602	Pedagogy of Studies
3IC603	Disaster Management
3IC604	Value Education

Semester	I	II	III	IV	Total
Credits	18	21	13	16	68

**Walchand College of Engineering, Sangli**  
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**Curriculum Comparison for WCE and AICTE**

<b>M. Tech. Electrical (Control System Engineering)</b>					
Sr. No.	Category	Credits		%	
		AICTE	Dept	AICTE	Dept
1	PC	12	13	17.6	19.1
2	PE	15	16	22.1	23.5
3	PCL	10	6	14.7	8.8
4	OE	3	3	4.4	4.4
5	PC	26	26	38.2	38.2
6	MC	2	2	2.9	2.9
7	PC	0	2	0.0	2.9
8	PC	0	0	0.0	0.0
9	MC	0	0	0.0	0.0
<b>Total Credits</b>		<b>68</b>	<b>68</b>	<b>100</b>	<b>100</b>

**Category**

Core theory courses (PC)

Programme Elective courses relevant to chosen specialization/ branch& (PE)

Core/Elective laboratory courses (PCL)

Open subjects – Electives from other technical and /or emerging subjects (OE)

Dissertation (PC)

Mandatory course on Research Methodology (MC)

Pre-dissertation work and seminar (PC)

Summer Internship (PC)

Mandatory Non- credit Courses (MC)

# **Walchand College of Engineering, Sangli**

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## **Curriculum (Structure)**

**for**

**M.Tech. in Electrical**

**(Power System Engineering)**

**With Effect From**

**Academic Year**

**2018-2019 (F. Y. M. Tech.)**

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**Walchand College of Engineering, Sangli**  
(An Autonomous Institute)  
Teaching and Evaluation Scheme  
**First year M. Tech. Program in Electrical (Power System Engineering)**  
Semester I

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
MC	3PS501	Research Methodology for Electrical Engineers	2	-	-	2	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3PS502	Power Apparatus Modeling	3	1	-	4	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3PS503	Digital Protection of Power System	3	-	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PE	3PS5**	Professional Elective 1	3	-	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PE	3PS5**	Professional Elective 2	3	-	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3PS551	Digital Protection of Power System Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
PE	3PS5**	Professional Elective 1 Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
PE	3PS5**	Professional Elective 2 Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
Total			14	1	6	18	<b>Total Credits: 18</b> <b>Total Contact Hrs: 21</b>			

Professional Elective 1			Professional Elective 2		
3PS511	3PS561	DSP Application to Power System	3PS513	3PS563	Neural Network and Fuzzy Application to Power System
3PS512	3PS562	Application of Power Electronics to Power Systems	3PS514	3PS564	Grid Integration of Renewable Energy



**Walchand College of Engineering, Sangli**  
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Teaching and Evaluation Scheme  
**First year M. Tech. Program in Electrical (Power System Engineering)**  
Semester II

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
OE	3OE5**	Open Elective	3	--	--	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3PS521	Power System Dynamics	3	1	--	4	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3PS522	Power Quality in Distribution Systems	3	-	--	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PE	3PS5**	Professional Elective 3	3	-	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PE	3PS5**	Professional Elective 4	3	-	-	3	ISE 1	10	20	40
							MSE	30		
							ISE 2	10		
							ESE	50		
PC	3PS571	Power Quality in Distribution Systems Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
PE	3PS5**	Professional Elective 3 Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
PE	3PS5**	Professional Elective 4 Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
PC	3PS541	Pre-dissertation work and seminar	-	-	4	2	ISE	100	40	
Total			15	1	10	21	<b>Total Credits: 21 Total Contact Hrs: 26</b>			

<b>Professional Elective 3</b>		
3PS531	3PS581	Computer Aided Power System Analysis
3PS532	3PS582	EHVAC
3PS533	3PS583	Deregulated Power System
<b>Professional Elective 4</b>		
3PS534	3PS584	PLC and Embedded systems
3PS535	3PS585	Smart Grid

<b>Open Elective</b>		
Course Code	Course Name	Offered by Department
3OE501	Design Optimization	Applied Mechanics
3OE502	Structural Health Monitoring and Smart Materials	
3OE515	Life Cycle Assessment and Ecolabelling	Civil Engineering
3OE516	Construction Equipment	
3OE529	Business Analytics	Mechanical Engineering
3OE530	Industrial Safety	
3OE531	Operations Research	
3OE532	Cost Management of Engineering Projects	
3OE533	Composite Materials	
3OE534	Waste to Energy.	
3OE535	Project Based Learning with Embedded System	
3OE543	Control Techniques for Electrical Drives.	Electrical Engineering
3OE544	Neural Network and Fuzzy Control.	
3OE557	Remote sensing and Image Analysis	Electronics Engineering
3OE558	Automotive Electronics	
3OE559	Mechatronics	
3OE560	Digital Image processing	
3OE561	Nano materials and Nano-technology	
3OE562	Numerical Methods for Engineers	
3OE563	Optimization Techniques	
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3OE 572	Cyber Security	
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Teaching and Evaluation Scheme  
**Second year M. Tech. Program in Electrical (Power System Engineering)**  
Semester I

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
PE	3PS6**	Professional Elective 5	3	-	-	3	ISE 1	10	40	
							MSE	30		
							ISE 2	10		
							ESE	50		20
PC	3PS690	Dissertation phase I	-	-	5	4	ISE	100	40	
	3PS691	Dissertation phase II				2	ISE	100	40	
						4	ESE	100	40	
MC	3IC6**	Mandatory Non Credit Course	2	-	-	-	ISE 1	35	40	
							MSE	30		
							ISE 2	35		
Total			5	-	5	13	<b>Total Credits: 13 Total Contact Hrs:10</b>			

**Semester II**

Course			Teaching Scheme				Evaluation Scheme			
Category	Code	Name	L	T	P	Credits	Component	Marks		
								Max	Min for Passing	
PC	3PS692	Dissertation phase III	-	-	5	4	ISE	100	40	
	3PS693	Dissertation phase IV				4	ISE	100	40	
						8	ESE	100	40	
MC	3IC6**	Mandatory Non Credit Course	2	-	-	-	ISE 1	35	40	
							MSE	30		
							ISE 2	35		
Total			-	-	5	16	<b>Total Credits: 16 Total Contact Hrs: 5</b>			

<b>Professional Elective 5</b>	
3PS611	Modern Power Electronics
3PS612	HVDC Transmission
3PS613	HV Engineering

<b>List of Mandatory Non Credit Course</b>	
3IC601	Constitution of India
3IC602	Pedagogy of Studies
3IC603	Disaster Management
3IC604	Value Education

Semester	I	II	III	IV	Total
Credits	18	21	13	16	68

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**Curriculum Comparison for WCE and AICTE**

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<b>Sr. No.</b>	<b>Category</b>	<b>Credits</b>		<b>%</b>	
		<b>AICTE</b>	<b>Dept</b>	<b>AICTE</b>	<b>Dept</b>
1	PC	12	14	17.6	20.6
2	PE	15	15	22.1	22.1
3	PCL	10	6	14.7	8.8
4	OE	3	3	4.4	4.4
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<b>Total Credits</b>		<b>68</b>	<b>68</b>	<b>100</b>	<b>100</b>

**Category**

Core theory courses (PC)

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Pre-dissertation work and seminar (PC)

Summer Internship (PC)

Mandatory Non- credit Courses (MC)