

# **DOCTOR OF PHILOSOPHY IN CHEMICAL ENGINEERING**

#### **Curriculum Structure**

## The PhD Program (Total 60 Cr Hrs)

Curriculum Component	Number of Courses	Total Number Cr Hrs
Core Courses	5	15
Elective courses	4	12
Thesis	1	33
Total:	12	60

#### **Chemical Engineering Thesis Requirement (33 Cr Hrs)**

Thesis course			
Course ID Course Title			
<b>DENG 899</b>	PhD Thesis		

### **Core Required Courses (15 Cr Hrs)**

Core Requirements (6 Cr Hrs)				
Course ID	Course Title			
<b>DENG 602</b>	Applied Research Methodology			
<b>DENG 621</b>	Graduate Seminar			
Core Requirements sub-package (9 Cr Hrs)				
<b>DENG 603</b>	Advanced Numerical Analysis			
<b>DENG 604</b>	Applied Statistics Techniques			
<b>DENG 624</b>	Innovation and Technology Management			
<b>DENG 625</b>	Sustainable Development			
<b>DENG 626</b>	Modeling and Simulation			

#### **Concentration in Chemical Engineering (12 Cr Hrs)**

Elective courses				
Course ID	Course Title			
CHME 650	Transport Phenomena			
CHME 653	Advanced Process Dynamics and Control			
CHME 661	Principles of Bioprocess Engineering			
CHME 662	Advanced Chemical Engineering Thermodynamics			
CHME 651	Special Topics I			
CHME 652	Special Topics II			

#### **STUDY PLAN**

FIRST SEMESTER (9Cr Hrs)  Term						
Fall DENG 602 Applied Research Methodology DENG XXX Core Required Course I 3 CHME XXX Concentration Elective Course I 3 Total 9  SECOND SEMESTER (9 Cr Hrs)  Term Course # Course Title Cr Hrs  Spring DENG 621 Graduate Seminar 3 DENG XXX Core Required Course II 3 CHME XXX Concentration Elective Course II 3 Total 9  THIRD SEMESTER (9 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG XXX Core Required Course III 3 CHME XXX Concentration Elective Course IV 3 Total 9  FOURTH SEMESTER (9 Cr Hrs)  Term Course # Course Title Cr Hrs  Spring DENG 899 PhD Thesis 9 Total 9  FIFTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12  SIXTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12  SIXTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12	FIRST	SEMESTE	R (9Cr Hrs)			
DENG XXX Core Required Course I 3 CHME XXX Concentration Elective Course I 9  SECOND SEMESTER (9 Cr Hrs)  Term Course # Course Title Cr Hrs  Spring DENG 621 Graduate Seminar 3 DENG XXX Core Required Course II 3 CHME XXX Concentration Elective Course II 3 Total 9  THIRD SEMESTER (9 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG XXX Core Required Course III 3 CHME XXX Concentration Elective Course III 3 CHME XXX Concentration Elective Course III 3 CHME XXX Concentration Elective Course IV 3 Total 9  FOURTH SEMESTER (9 Cr Hrs)  Term Course # Course Title Cr Hrs  Spring DENG 899 PhD Thesis 9 Total 9  FIFTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12  SIXTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12  SIXTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12	Term	Course #	Course Title	Cr Hrs		
CHME XXX   Concentration Elective Course I   3   Total   9    SECOND SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs   Spring   DENG 621   Graduate Seminar   3   DENG XXX   Core Required Course II   3   CHME XXX   Concentration Elective Course II   3   Total   9    THIRD SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs   Fall   DENG XXX   Core Required Course III   3   CHME XXX   Concentration Elective Course III   3   CHME XXX   Concentration Elective Course IV   3   Total   9    FOURTH SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs   Spring   DENG 899   PhD Thesis   9   Total   9    FIFTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs   Fall   DENG 899   PhD Thesis   12   SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs   Fall   DENG 899   PhD Thesis   12   SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs   Fall   DENG 899   PhD Thesis   12    Total   12   SIXTH SEMESTER (12 Cr Hrs)	Fall	<b>DENG 602</b>	Applied Research Methodology	3		
Total 9  SECOND SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Spring   DENG 621   Graduate Seminar   3   DENG XXX   Core Required Course II   3   CHME XXX   Concentration Elective Course II   3    Total   9  THIRD SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Fall   DENG XXX   Concentration Elective Course III   3   CHME XXX   Concentration Elective Course III   3   CHME XXX   Concentration Elective Course IV   3   Total   9  FOURTH SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Spring   DENG 899   PhD Thesis   9   FIFTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12		DENG XXX	Core Required Course I	3		
SECOND SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Spring   DENG 621   Graduate Seminar   3    DENG XXX   Core Required Course II   3    CHME XXX   Concentration Elective Course II   3    Total   9    THIRD SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Eall   DENG XXX   Core Required Course III   3    CHME XXX   Concentration Elective Course III   3    CHME XXX   Concentration Elective Course IV   3    Total   9    FOURTH SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Spring   DENG 899   PhD Thesis   9    FIFTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Fall   DENG 899   PhD Thesis   12    SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Fall   DENG 899   PhD Thesis   12    SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Fall   DENG 899   PhD Thesis   12    Total   12    SIXTH SEMESTER (12 Cr Hrs)		CHME XXX	Concentration Elective Course I	3		
Term   Course #   Course Title   Cr Hrs  Spring   DENG 621   Graduate Seminar   3   DENG XXX   Core Required Course II   3   CHME XXX   Concentration Elective Course II   3    Total   9    THIRD SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Fall   DENG XXX   Concentration Elective Course III   3   CHME XXX   Concentration Elective Course III   3   CHME XXX   Concentration Elective Course IV   3   Total   9    FOURTH SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Spring   DENG 899   PhD Thesis   9   FIFTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12    Term   Course #   Course Title   Cr Hrs  Fall   DENG 899   PhD Thesis   12			Total	9		
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CHME XXX   Concentration Elective Course II   3    Total   9    THIRD SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Eall   DENG XXX   Core Required Course III   3    CHME XXX   Concentration Elective Course III   3    CHME XXX   Concentration Elective Course IV   3    Total   9    FOURTH SEMESTER (9 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Spring   DENG 899   PhD Thesis   9    Total   9    FIFTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Fall   DENG 899   PhD Thesis   12    SIXTH SEMESTER (12 Cr Hrs)  Term   Course #   Course Title   Cr Hrs    Term   Course #   Course T	Spring	<b>DENG 621</b>	Graduate Seminar	3		
Total  Total  THIRD SEMESTER (9 Cr Hrs)  Term		DENG XXX	Core Required Course II	3		
THIRD SEMESTER (9 Cr Hrs)  Term		CHME XXX	Concentration Elective Course II	3		
Term         Course #         Course Title         Cr Hrs           Fall         DENG XXX         Core Required Course III         3           CHME XXX         Concentration Elective Course IV         3           Total         9           FOURTH SEMESTER (9 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Spring         DENG 899         PhD Thesis         9           Total         9           FIFTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12           SIXTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12			Total	9		
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CHME XXX Concentration Elective Course III 3  CHME XXX Concentration Elective Course IV 3  Total 9  FOURTH SEMESTER (9 Cr Hrs)  Term Course # Course Title Cr Hrs  Spring DENG 899 PhD Thesis 9  Total 9  FIFTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12  Total 12  SIXTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12  SIXTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12	Term	Course #	Course Title	Cr Hrs		
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Total   9		CHME XXX	Concentration Elective Course III	3		
FOURTH SEMESTER (9 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Spring         DENG 899         PhD Thesis         9           Total         9           FIFTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall DENG 899         PhD Thesis         12           SIXTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall DENG 899         PhD Thesis         12		CHME XXX	Concentration Elective Course IV	3		
Term         Course #         Course Title         Cr Hrs           Spring         DENG 899         PhD Thesis         9           Total         9           FIFTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12           SIXTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12			Total	9		
Spring         DENG 899         PhD Thesis         9           Total         9           FIFTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12           SIXTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12	FOUR	TH SEMES	TER (9 Cr Hrs)			
Total   9	Term	Course #	Course Title	Cr Hrs		
FIFTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12           Total         12           SIXTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12	Spring	<b>DENG 899</b>	PhD Thesis	9		
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Fall         DENG 899         PhD Thesis         12           Total         12           SIXTH SEMESTER (12 Cr Hrs)           Term         Course #         Course Title         Cr Hrs           Fall         DENG 899         PhD Thesis         12	FIFTH	SEMESTEI	R (12 Cr Hrs)			
Total 12  SIXTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12	Term	Course #	Course Title	Cr Hrs		
SIXTH SEMESTER (12 Cr Hrs)  Term Course # Course Title Cr Hrs  Fall DENG 899 PhD Thesis 12	Fall	<b>DENG 899</b>	PhD Thesis	12		
TermCourse #Course TitleCr HrsFallDENG 899PhD Thesis12		Total				
Fall DENG 899 PhD Thesis 12	SIXTH	SIXTH SEMESTER (12 Cr Hrs)				
	Term	Course #	Course Title	Cr Hrs		
Total 12	Fall	<b>DENG 899</b>	PhD Thesis	12		
17001	Total			12		