Course Changes

Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional

• Submit original form and attachments •

RECEIVED
JAN 16 2013
GRADUATE STUDIES

1. Request submitted by *(Department or Program Name)*: Physics and Astronomy

2. Course prefix, number and complete title of course: PHYS 606 Quantum Mechanics

Attach a brief supporting statement for changes made to items 3a thru 3d. and 6 below.

3. Change requested

   a. Prerequisite(s): From: _____ To: _____

   b. Withdrawal (reason): _____

   c. Cross-list with: _____

   Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.

   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. **Attach a course syllabus.**

4. For informational purposes only, please indicate course number if this course will be stacked: _____

5. Complete current course title and current catalog course description:

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

7. a. As currently in course inventory:

Prefix	Course #	Title (excluding punctuation)
PHYS	606	QUANTUM MECHANICS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	FICE Code	Level
04	00	04	4008010002	2300	003632	

b. Change to:

Prefix	Course #	Title (excluding punctuation)
PHYS	606	QUANTUM MECHANICS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	Acad. Year	FICE Code	Level
03	00	03	4008010002	2300	13-14	003632	

Approval recommended by:

George R. Welch — 11.21.2012
Department Head or Program Chair *(Type Name & Sign)* Date
George R Welch

Department Head or Program Chair *(Type Name & Sign)* Date
(if cross-listed course)

Submitted to Coordinating Board by:

Associate Director, Curricular Services

Chair, College Review Committee — 12-10-12 Date

Dean of College — 1-9-13 Date

Chair, GC or UCC — 2-7-13 Date

Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.

PHYS 606: Quantum Mechanics I

spring 2013

Instructor
Dr. Aleksei Zheltikov
zheltikov@physics.tamu.edu
MPHY 542
979.458.7934

Course meetings
TR 12:45-2:00pm in MPHY 107

Final exam
Wednesday, May 8, 2013; 8:00-10:00am

Course (catalog) description

Schrödinger wave equation, bound states of simple systems, collision theory, representation and expansion theory, matrix formulation, perturbation theory.

Prerequisites

MATH 601, PHYS 412 or equivalents

Texts

required

Quantum Mechanics, 3rd ed.; Dec 1997
by Eugen Merzbacher
publisher: Wiley
ISBN-10: 0471887021
ISBN-13: 978-0471887027

recommended

Quantum Mechanics Non-Relativistic Theory, 3rd ed., vol. 3; 2000
by L. D. Landau and E. M. Lifshitz
publisher: Butterworth-Heinemann
ISBN-10: 0750635398
ISBN-13: 978-0750635394

recommended

Modern Quantum Mechanics, 2nd ed.; Jul 2010
by J. J. Sakurai and Jim J. Napolitano
publisher: Addison Wesley
ISBN-10: 0805382917
ISBN-13: 978-0805382914

Grading

50% homework assignments
50% two (2) exams
A = 90% or higher
B = 80%-90%
C = 60%-80%
See *http://student-rules.tamu.edu/rule07* for information on University-excused absences.

Topics

Basic principles of quantum mechanics
Wave packets
Wave mechanics

- Schrödinger equation, both time dependent and time independent
  - Operators, probabilities, and expectation values for physical observables
  - Eigenvalues and eigenfunctions of operators
  - Commutators
  - Uncertainty relations
  - Transformations between bases
  - Matrix mechanics
- Exactly solvable 1-D problems
  - Sectionally-constant potentials
  - Harmonic oscillator, in both wave and matrix mechanics
- Approximation methods in quantum mechanics
  - Variational method
  - Time-independent perturbation theory
- Angular momentum in quantum mechanics
  - Basic principles
  - Allowed eigenvalues and eigenfunctions
  - Spin ½
- Spherically symmetric potentials
  - Free particle
  - Finite square well
  - Hydrogen atom

ADA statement

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academic integrity

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Texas A&M University
Departmental Request for a Change in Course
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GRADUATE STUDIES

1. Request submitted by *(Department or Program Name)*: Physics and Astronomy

2. Course prefix, number and complete title of course: PHYS 607 Statistical Mechanics

Attach a brief supporting statement for changes made to items 3a thru 3d, and 6 below.

3. Change requested

   a. Prerequisite(s): From: _____ To: _____

   b. Withdrawal (reason): _____

   c. Cross-list with: _____

   Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.

   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. **Attach a course syllabus.**

4. For informational purposes only, please indicate course number if this course will be stacked: _____

5. Complete current course title and current catalog course description:

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

7. a. As currently in course inventory:

Prefix	Course #	Title (excluding punctuation)
PHYS	607	STASTICAL MECHANICS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	FICE Code	Level
04	00	04	40080100022	2300	003632	

b. Change to:

Prefix	Course #	Title (excluding punctuation)
PHYS	607	STASTICAL MECHANICS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	Acad. Year	FICE Code	Level
03	00	03	40080100022	2300	13-14	003632	

Approval recommended by:

George R. Welch — 11.21.2012
Department Head or Program Chair *(Type Name & Sign)* Date

12-10-12
Chair, College Review Committee Date

George R. Welch
Department Head or Program Chair *(Type Name & Sign)* Date
(if cross-listed course)

1-9-13
Dean of College Date

Submitted to Coordinating Board by:

2-7-13
Chair, GC or UCC Date

Associate Director, Curricular Services — Date — Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.

PHYS 607: Statistical Mechanics

spring 2013

Instructor
Dr. Artem Abanov
abanov@physics.tamu.edu
MPHY 415
404.981.7799

Course meetings
MWF 10:20-11:10am in MPHY 107

Final exam
Tuesday, May 7, 2013; 8:00-10:00am

Course (catalog) description

Classical statistical mechanics, Maxwell-Boltzmann distribution, and equipartition theorem quantum statistical mechanics, Bose-Einstein distribution and Fermi-Dirac distribution applications such as polyatomic gases, blackbody radiation, free electron model for metals, Debye model of vibrations in solids, ideal quantum mechanical gases and Bose-Einstein condensation, and if time permits, phase transitions and nonequilibrium statistical mechanics.

Prerequisites

PHYS 408 and 412 or equivalents

Texts

required

Statistical Mechanics, 3rd ed., pt. 1, vol. 5; Jan 1980
by L. D. Landau and E. M. Lifshitz
publisher: Butterworth-Heinemann
ISBN-10: 0750633727
ISBN-13: 978-0750633727

recommended

Statistical Mechanics, May 1990
by R. Kubo, H. Ichimura, T. Usui, and N. Hashitsume
publisher: North Holland
ISBN-10: 0444871039
ISBN-13: 978-0444871039

Grading

50% weekly homework assignments
30% two (2) exams at 15% each
20% final exam
No late work is accepted without appropriate excuse. Attendance is required. Make-up exams will be provided to those with a University-excused absence. See *http://student-rules.tamu.edu/rule07* for information on University-excused absences.

Topics

Thermodynamics
- First law of thermodynamics — conservation of energy
- Entropy
- Definition of intensive parameters, T, P, and μ, equations of state
- Second law of thermodynamics — maximum work theorem
- Legendre transformations and alternative formulation of thermodynamics — thermodynamic potentials

Reduction of thermodynamics derivatives — measurable physical properties
Thermodynamic inequalities and stability
Nernst's theorem
Phase transitions — discontinuities, level rule, Clausius-Clapeyron
Mixtures — Gibbs phase rule, osmotic pressure

Statistical mechanics
Microcanonical formalism
Classical statistical mechanics — phase space, distribution functions
Canonical formalism
Classical ideal gas (internal degrees of freedom, translation, vibration, rotation, electronic)
Density of states — Debye model of crystals
Mean field theory — Ising model
Grand canonical formalism
Fermi and Bose statistics
Ideal Fermi gas
Photon gas
Ideal Bose gas — Bose Einstein condensation
Interacting classical gas
Fluctuations
Density matrices

Optional topics
Simple transport theory based on Maxwell distribution
Second order phase transitions

ADA statement

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Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional

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1. Request submitted by *(Department or Program Name)*: Physics and Astronomy

2. Course prefix, number and complete title of course: PHYS 611 Electromagnetic Theory

Attach a brief supporting statement for changes made to items 3a thru 3d, and 6 below.

3. Change requested

   a. Prerequisite(s): From: _____ To: _____

   b. Withdrawal (reason): _____

   c. Cross-list with: _____

   Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.

   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. **Attach a course syllabus.**

4. For informational purposes only, please indicate course number if this course will be stacked: _____

5. Complete current course title and current catalog course description:

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

7. a. As currently in course inventory:

Prefix	Course #	Title (excluding punctuation)
PHYS	611	ELECTROMAGNETIC THEORY

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	FICE Code	Level
04	00	04	4008010002	2300	003632	

b. Change to:

Prefix	Course #	Title (excluding punctuation)
PHYS	611	ELECTROMAGNETIC THEORY

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	Acad. Year	FICE Code	Level
03	00	03	4008010002	2300	13-14	003632	

Approval recommended by:

George R. Welch — 11.21.2012
Department Head or Program Chair *(Type Name & Sign)* Date

George R Welch
Department Head or Program Chair *(Type Name & Sign)* Date
(if cross-listed course)

Submitted to Coordinating Board by:

Associate Director, Curricular Services

Chair, College Review Committee — 12-10-12 Date

Dean of College — 1-9-13 Date

Chair, GC or UCC — 2-7-13 Date

Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 02/11

PHYS 611: Electromagnetic Theory II

fall 2012

Instructor
Dr. Christopher Pope
pope@physics.tamu.edu
MIST M520
979.845.7793

Course meetings
MWF 9:10-10:00am in MPHY 213

Final exam
Monday, December 10, 2012; 8:00-10:00am

Course (catalog) description

Continuation of PHYS 603. Propagation, reflection and refraction of electromagnetic waves; wave guides and cavities; interference and diffraction; simple radiating systems; dynamics of relativistic particles and fields; radiation by moving charges.

Prerequisites

PHYS 603

Texts

recommended

The Classical Theory of Fields, 4th ed., vol. 2(Course of Theoretical Physics Series); Jan 1980
by L. D. Landau and E. M. Lifshitz
publisher: Butterworth-Heinemann
ISBN-10: 0750627689
ISBN-13: 978-0750627689

recommended

Classical Electrodynamics, 3rd ed., August 1998
by John David Jackson
publisher: Wiley
ISBN-10: 047130932X
ISBN-13: 978-0471309321

Grading

20% homework assignments
25% midterm 1
25% midterm 2
30% final exam
See *http://student-rules.tamu.edu/rule07* for information on University-excused absences.

Topics

Electrodynamics and special relativity/ Minkowski spacetime, Lorentz transformations, suffix notation for 4-vectors and tensors, proper time, 4-velocity

Maxwell's equations in 4-tensor notation; gauge potentials and gauge invariance, Lorentz transformations of E and B, Lorentz force

Action principle for charged particle, canonical momentum and Hamiltonian, relativistic particle motion in E and B fields, relativistic orbits in Coulomb potential

Action principle for electrodynamics; energy density and flux, energy-momentum tensor

Electromagnetic waves, polarization, waveguides, resonant cavities

Fields due to moving charges; retarded potentials, Lienard-Wiechert potentials, Larmor formula, angular and frequency distributions of radiated power, Cerenkov radiation, Thompson scattering

Multipole expansion, dipole radiation, higher multipoles, antennae

Electromagnetism and quantum mechanics; gauge transformations, covariant derivative, magnetic monopoles, Dirac quantisation

ADA statement

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Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional

• Submit original form and attachments •

1. Request submitted by *(Department or Program Name)*: Physics and Astronomy
2. Course prefix, number and complete title of course: PHYS 615 Methods of Theoretical Physics I

Attach a brief supporting statement for changes made to items 3a thru 3d. and 6 below.

3. Change requested
   a. Prerequisite(s): From: _____ To: _____
   b. Withdrawal (reason): _____
   c. Cross-list with: _____

Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.
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4. For informational purposes only, please indicate course number if this course will be stacked: _____
5. Complete current course title and current catalog course description:

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

7. a. As currently in course inventory:

Prefix	Course #	Title (excluding punctuation)
PHYS	615	METH OF THRTCL PHYS I

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	FICE Code	Level
04	00	04	4008010002	2300	003632	

b. Change to:

Prefix	Course #	Title (excluding punctuation)
PHYS	615	METH OF THRTCL PHYS I

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	Acad. Year	FICE Code	Level
03	00	03	4008010002	2300	13 - 14	003632	

Approval recommended by:

George R. Welch — 11.21.2012
Department Head or Program Chair *(Type Name & Sign)* Date

George R Welch
Department Head or Program Chair *(Type Name & Sign)* Date
(if cross-listed course)

Submitted to Coordinating Board by:

Associate Director, Curricular Services

12-10-12
Chair, College Review Committee Date

1-9-13
Dean of College Date

2-7-13
Chair, GC or UCC Date

Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 02/11

PHYS 615: Methods of Theoretical Physics I

spring 2013

Instructor
Dr. Ergin Sezgin
sezgin@physics.tamu.edu
MIST M521
979.845.7795

Course meetings
TR 2:20-3:35pm in MPHY 107

Final exam
Wednesday, May 8, 2013; 1:00-3:00pm

Course (catalog) description

Orthogonal eigenfunctions with operator and matrix methods applied to solutions of the differential and integral equations of mathematical physics; contour integration, asymptotic expansions of Fourier transforms, the method of stationary phase and generalized functions applied to problems in quantum mechanics.

Prerequisites

MATH 311, 407, and 412 or equivalents

Texts

recommended

Mathematical Methods of Physics, 2nd ed.; 1970
by Jon Mathews and Robert L. Walker
publisher: W. A. Benjamin
ISBN-10: 0805370021
ISBN-13: 978-0805370027

Grading

50% homework assignments, plus class participation
25% two midterms
25% final exam
See *http://student-rules.tamu.edu/rule07* for information on University-excused absences.

examinations

The first midterm will be administered approximately six weeks into the semester; the second midterm will follow approximately six weeks after the first exam. No books or notes will be permitted during examinations. The final exam will cover all topics discussed in class.

homework

Weekly problem sets will be required. There will be a total of twelve sets during the semester. Students may work together on the problem assignments, but each student must turn in solutions written entirely in his/her own handwriting. Active participation in class by asking or answering questions will also count towards grades. An extension of the deadline to turn in homework may be approved in special situations, but homework will not be accepted after the solutions have been posted.

Topics

Differential equations of physics; first-order equations, separation of variables

Legendre equation, properties of Legendre polynomials, generating function, Rodrigues' formula, Associated Legendre functions, spherical harmonics

Singular points of second-order ODEs, Wronskian, series solutions, Green-function methods, Sturm-

Liouville theory

Functions of a complex variable; complex numbers, analytic functions, contour integration, classification of singularities, calculus of residues, evaluation of real integrals, summation of series, analytic continuation

Gamma function, Riemann zeta function, asymptotic expansions, method of steepest descent

Cartesian vectors and tensors, rotation group, tensor calculus

ADA statement

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Texas A&M University
Departmental Request for a Change in Course
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• Submit original form and attachments •

1. Request submitted by *(Department or Program Name)*: Physics and Astronomy
2. Course prefix, number and complete title of course: PHYS 619 Modern Computational Physics

Attach a brief supporting statement for changes made to items 3a thru 3d, and 6 below.

3. Change requested
   a. Prerequisite(s): From: _____ To: _____
   b. Withdrawal (reason): _____
   c. Cross-list with: _____

Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.
   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. **Attach a course syllabus.**
4. For informational purposes only, please indicate course number if this course will be stacked: _____
5. Complete current course title and current catalog course description:

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

7. a. As currently in course inventory:

Prefix	Course #	Title (excluding punctuation)
PHYS	619	MOD COMPUTATIONAL PHYS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	FICE Code	Level
03	00	034	0008020002	2300	003632	6

   b. Change to:

Prefix	Course #	Title (excluding punctuation)
PHYS	619	MOD COMPUTATIONAL PHYS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	Acad. Year	FICE Code	Level
02	02	034	0008020002	2300	13-14	003632	6

Approval recommended by:

George R. Welch — 11.27.2012
Department Head or Program Chair *(Type Name & Sign)* Date

George R Welch
Department Head or Program Chair *(Type Name & Sign)* Date
(if cross-listed course)

Submitted to Coordinating Board by:

Associate Director, Curricular Services

Chair, College Review Committee — 12-10-12 Date

Dean of College — 1-9-13 Date

Chair, GC or UCC — 2-7-13 Date

Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 02/11

COLLEGE OF SCIENCE

Department of Physics

Helmut G. Katzgraber
Associate Professor

PHYS 619 – Computational Physics (Spring 2014)

Meeting times	Lecture	Monday and Wednesday	12:40 – 13:30 (MPHYS 213)
	Lab	Monday	15:00 – 16:40 (MPHYS 330A)

Course description Introduction to computational and simulational techniques widely used in physics applications and research, including trajectory integration, wave motion analysis, molecular dynamics, (quantum) Monte Carlo methods, statistical mechanics of spin systems, phase transitions, quantum evolution, bound state problems, and variational methods. Introduction to computer architectures, GPU and HPC programming for physicists. 3 credits.

Prerequisites
PHYS 408 (or equivalent)
PHYS 412 (or equivalent)
knowledge of a high-level language such as C (via CSCE 206 or equivalent) and a scripting language

Course website http://katzgraber.org/teaching/SS14-401-619 (all information posted online)

Instructor
Helmut G. Katzgraber
MPHYS 409
hgk@tamu.edu
979 845 8532

Office Hours by appointment

TA Ross McDonald

Grading Policies

Lab	20%
Homework	20%
Semester-long project	40%
Written report	10%
End-of-semester Presentation	10%

Note that there will be no midterms or a final exam. If you score 70% or lower in the lab, you fail the course. The projects will be distributed in the first week.

Mitchell Physics Building
4242 TAMU
College Station TX 77843-4242, USA

Telephone: (979) 845 8532
Fax: (979) 845 2590
Email: hgk@tamu.edu
Web: http://katzgraber.org

COLLEGE OF SCIENCE

Department of Physics

Helmut G. Katzgraber
Associate Professor

Textbook The lecture notes will serve as cliff notes to multiple textbooks that will be introduced in the first lecture.

Syllabus

1. Introduction to programming techniques and computer architectures via numerical solutions of ODEs (e.g., Euler, Runge-Kutta).

2. Harmonic oscillators (Verlet and symplectic methods), transition to chaos (Lyapunov exponents, logistic map, ...), Duffing equation.

3. Kepler problem (deviations from $1/r^2$ orbits, 3-body problem).

4. Partial differential equations (Laplace, Poisson equations).

5. Fractals (Newton-Raphson, Mandelbrodt, Sierpinsky).

6. Random systems: Random-number generators, random walks, percolation.

7. Statistical mechanics and phase transitions (Ising model, Monte Carlo methods, first vs second-order phase transitions).

8. Statistical data analysis (fitting, plotting, ...)

9. Molecular dynamics

10. Quantum mechanics (shooting and matching methods, matrix methods, exact diagonalization, variational approaches and quantum Monte Carlo methods).

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Email: hgk@tamu.edu
Web: http://katzgraber.org

COLLEGE OF SCIENCE

Department of Physics

Helmut G. Katzgraber
Associate Professor

Lab component

1. Development of proper coding techniques and provenance. Use of common tools such as version control systems, debuggers, profilers. Code optimization to illustrate different computer hardware components.

2. Introduction to symbolic programming with Mathematica by applying the concepts learned in class to chaotic systems (Duffing equation and damping).

3. Kepler problem, programming anharmonic oscillators with high-level languages.

4. Numerical determination of electric field distributions (introduction to GPU computing).

5. Using symbolic languages to efficiently study fractal systems (emphasis on graphical display of the results).

6. Good vs bad random number generators, tests, efficient implementations. Introduction to MPI and parallel programming illustrated via the computation of π using random sampling on multi-core systems.

7. Importance vs simple sampling, Markov chains, simulation of the one-dimensional Ising model (in class from scratch).

8. Hands-on statistical data analysis lab, computing error bars via bootstrap and jackknife methods. Fitting and plotting with gnuplot.

9. Solidification and melting transition, jamming of granular systems.

10. Solving of time-independent Schrödinger equations, variational methods (harmonic oscillator), matrix methods (anharmonic oscillator), shooting, quantum Monte Carlo.

11. Introduction to the LaTeX typesetting language. Presentation skills.

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Fax: (979) 845 2590
Email: hgk@tamu.edu
Web: http://katzgraber.org

COLLEGE OF SCIENCE

Department of Physics

Helmut G. Katzgraber
Associate Professor

Semester-long projects

These shall be tackled by teams of 2 – 3 students. Topics include: two-dimensional Ising model with cluster algorithms, hysteresis in magnetic materials with randomness, computing electric field distributions of complex geometries with GPUs, parallel molecular dynamics simulations, etc.

ADA Policy Statement

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College Station TX 77843-4242, USA

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Fax: (979) 845 2590
Email: hgk@tamu.edu
Web: http://katzgraber.org

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GRADUATE STUDIES

Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional

• Submit original form and attachments •

1. Request submitted by *(Department or Program Name)*: Physics and Astronomy

2. Course prefix, number and complete title of course: PHYS 624 Quantum Mechanics

Attach a brief supporting statement for changes made to items 3a thru 3d, and 6 below.

3. Change requested

   a. Prerequisite(s): From: _____ To: _____

   b. Withdrawal (reason): _____

   c. Cross-list with: _____

   Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.

   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. **Attach a course syllabus.**

4. For informational purposes only, please indicate course number if this course will be stacked: _____

5. Complete current course title and current catalog course description:

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):

7. a. As currently in course inventory:

Prefix	Course #	Title (excluding punctuation)
PHYS	624	QUANTUM MECHANICS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	FICE Code	Level
04	00	04	4008010002	2300	003632	

b. Change to:

Prefix	Course #	Title (excluding punctuation)
PHYS	624	QUANTUM MECHANICS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	Acad. Year	FICE Code	Level
03	00	03	4008010002	2300	13-14	003632	

Approval recommended by:

George R. Welch — 11.21.2012
Department Head or Program Chair *(Type Name & Sign)* Date

George R Welch

Department Head or Program Chair *(Type Name & Sign)* Date
(if cross-listed course)

Submitted to Coordinating Board by:

Associate Director, Curricular Services

Chair, College Review Committee — 12-10-12 Date

Dean of College — 1-9-13 Date

Chair, GC or UCC — 2-7-13 Date

Date

Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.
Curricular Services – 02/11

PHYS 624: Quantum Mechanics II

fall 2012

Instructor
Dr. Valery Pokrovsky
valery@physics.tamu.edu
MPHY 457
979.845.1175

Course meetings
MW 4:10-5:25pm in MPHY 213

Final exam
Monday, May 6, 2013; 3:30-5:30pm

Course (catalog) description

Continuation of PHYS 606. Scattering theory, second quantization, angular momentum theory, approximation methods, application to atomic and nuclear systems, semiclassical radiation theory.

Prerequisites

MATH 601, PHYS 412 or equivalents

Texts

required

Quantum Mechanics, 3rd ed.; Dec 1997
by Eugen Merzbacher
publisher: Wiley
ISBN-10: 0471887021
ISBN-13: 978-0471887027

recommended

Quantum Mechanics Non-Relativistic Theory, 3rd ed., vol. 3; 2000
by L. D. Landau and E. M. Lifshitz
publisher: Butterworth-Heinemann
ISBN-10: 0750635398
ISBN-13: 978-0750635394

recommended

Modern Quantum Mechanics, 2nd ed.; Jul 2010
by J. J. Sakurai and Jim J. Napolitano
publisher: Addison Wesley
ISBN-10: 0805382917
ISBN-13: 978-0805382914

Grading

50% homework assignments
50% two (2) exams
A = 90% or higher
B = 80%-90%
C = 60%-80%
See *http://student-rules.tamu.edu/rule07* for information on University-excused absences.

Topics

- Elementary scattering theory; phase shifts and scattering; low and high-energy scattering; Lippmann-Schwinger formalism; Higher Born approximations; resonance scattering.
- Spin; SO(3) group and its irreducible representations; spin-orbit coupling; spin in magnetic field.
- Addition of angular momenta.

- Discrete symmetries: P, CP, CPT; time reversal invariance; Kramers degeneration.
- Propagators and path integrals; quantum interference phenomena: gravitational interference, Aharonov-Bohm effect.
- Adiabatic approximation; Berry's phase; Landau-Zener theory.
- Many-body quantum mechanics; second quantization; spin and statistics; atoms and molecules; Bose-Einstein condensation.

ADA statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 979-845-1637. For additional information visit *http://disability.tamu.edu*.

academic integrity

The Aggie Honor Code is *"An Aggie does not lie, cheat, or steal or tolerate those who do."* For more information, refer to the Honor Council Rules and Procedures on the web at *http://www.tamu.edu/aggiehonor*.

Texas A&M University
Departmental Request for a Change in Course
Undergraduate • Graduate • Professional

• Submit original form and attachments •

RECEIVED
JAN 28 2013
GRADUATE STUDIES

1. Request submitted by *(Department or Program Name)*: Department of Veterinary Large Animal Clinical Sciences

2. Course prefix, number and complete title of course: VLCS 422/622 Equine Disease and Epidemiology

Attach a brief supporting statement for changes made to items 3a thru 3d. and 6 below.

3. Change requested

   a. Prerequisite(s): From: _____ To: _____

   b. Withdrawal (reason): _____

   c. Cross-list with: _____

   Cross-listed courses require the signature of both department heads.

   d. Change in course title and description. Enter complete current course title and current course description in item 5; enter proposed course title and proposed course description in item 6. Complete item 7 for change in title.

   e. Change in course number, contact hours (lab & lecture), and semester credit hours. Complete item 7. **Attach a course syllabus.**

4. For informational purposes only, please indicate course number if this course will be stacked: VLCS 622

5. Complete current course title and current catalog course description:
   Equine Disease and Epidemiology

6. Complete proposed course title and proposed catalog course description (not to exceed 50 words):
   Equine Epidemiology and Infectious Diseases

7. a. As currently in course inventory:

Prefix	Course #	Title (excluding punctuation)
VLCS	422	EQUINE DISEASE EPIDEM

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	FICE Code	Level
					003632	

   b. Change to:

Prefix	Course #	Title (excluding punctuation)
VLCS	422	EQUINE EPIDEM&INFECT DIS

Lect.	Lab	SCH	CIP and Fund Code	Admin. Unit	Acad. Year	FICE Code	Level
					-	003632	

Approval recommended by:

Dr. Allen J. Roussel, Jr. — 1/8/13
Department Head or Program Chair *(Type Name & Sign)* — Date

Dr. Jane Welsh — 1/9/13
Chair, College Review Committee — Date

Department Head or Program Chair *(Type Name & Sign)* — Date
(if cross-listed course)

Dr. Eleanor Green — 1-10-13
Dean of College — Date

Submitted to Coordinating Board by:

Chair, GC or UCC — 2-7-13 — Date

Associate Director, Curricular Services — Date — Effective Date

Questions regarding this form should be directed to Sandra Williams at 845-8201 or sandra-williams@tamu.edu.