Exame Unificado de Pós-Graduações em Física

ATTENTION: We emphasize that the candidate who will do the EUF exam outside Brazil must appoint a Brazilian supervisor, which will need to confirm the indication in 48 hours for the registration to be effective. If the application is made by the candidate in the last two days available, the appointed Brazilian supervisor will still have only until 23:59H of March 16, 2014 (Brazilian official time) to confirm the interest in the supervision, since that is the deadline date for the closure of all applications. The Unified Examination in Physics - EUF - will be used as part of the selection process for the following Brazilian universities in the 2nd semester of 2014.

The Unified Examination in Physics - EUF - will be used as part of the selection process for the following Brazilian universities in the 2nd semester of 2014:

ITA - Instituto Tecnológico da Aeronáutica, São José dos Campos, SP
UEL - Universidade Estadual de Londrina, PR
UEPG - Universidade Estadual de Ponta Grossa, DF, Ponta Grossa, PR
UESC - Universidade Estadual de Santa Cruz, PROFISICA, Ilhéus, BA
UFABC - Universidade Federal do ABC, Santo André, SP
UFAL - Universidade Federal de Alagoas, AL
UFAM - Universidade Federal do Amazonas, AM
UFMT - Universidade Federal do Mato Grosso, Cuiabá, MT
UFPB - Universidade Federal da Paraíba, DF, João Pessoa, PB
UFPR - Universidade Federal do Paraná, Curitiba, DF, PR
UFSCar - Universidade Federal de São Carlos, São Carlos, SP
UNESP - Universidade Estadual Paulista, IFT, São Paulo, SP
UNICAMP - Universidade de Campinas, IFGW, Campinas, SP
UNICSUL - Universidade Cruzeiro do Sul, SP
UNIFEI - Universidade Federal de Itajubá, MG
USP - Universidade de São Paulo, FFCLRP, Ribeirão Preto, SP
USP - Universidade de São Paulo, IFSC, São Carlos, SP
USP - Universidade de São Paulo, IFUSP, São Paulo, SP

Follows the opening call of EUF for the 2nd semester of 2014, with detailed information on those responsible for its organization, disciplines relevant for the exam, and other relevant information to the candidates.

Public Notice

The Physics Graduate Program Commissions of the following institutions:

1. Instituto de Física - USP
2. Instituto de Física de São Carlos - USP
3. Instituto de Física “Gleb Wataghin” - UNICAMP
4. Instituto de Física Teórica - UNESP
5. Universidade Federal do ABC - UFABC

6. Universidade Federal de São Carlos - UFSCAR

make public the opening of the application and establish the regulations for the candidates selection exam for the Master Degree and Doctorate Degree courses, for the 2nd semester of 2014.

Web page of the Unified Examination in Physics: http://www.ifsc.usp.br/~posgraduacao/inf/exameUnificado2.php

About the registration:

1. The registration will be open from February 17 to March 16, 2014, and must be made online through the link: http://www.ifsc.usp.br/~posgrad/exame_pg/inscricao_euf

2. The registration for the examination does not imply that the candidate is automatically enrolled in the Graduate Programs that organize the exam. The candidate should register separately in the Graduate Institutions Program of interest. The application to the Programs of interest shall be made according to the specific rules of each institution/program within the timelines required by them. This information will be available on the pages of the Graduate Services of each institution/program.

THE TESTS

The selection test will be held in two stages, on the **23 and 24 of April 2014**, from the 14 to 18h (Brazilian official time) at the following locations in Brazil:

1. Instituto de Física da USP – Auditório Abraão de Morais
2. Instituto de Física de São Carlos - USP/São Carlos – Local a definir.
3. Instituto de Física "Gleb Wataghin" – UNICAMP – Sala IF-14
4. Instituto de Física Teórica – UNESP – 3º Andar
5. Universidade Federal do ABC – Campus da Rua Santa Adélia, 166 – Bloco B

For foreign examination locations, see instructions bellow.

The candidate may take the tests in an institution and enroll in the Graduate Programs in another institutions of its choice.

The organizing committee is establishing the necessary contacts to apply the test at the same time in locations properly distributed in Brazil and overseas. These locations are listed on the registration page of the EUF. The candidate should choose only one of these sites at the time of registration. it is not allowed to establish new application sites of the EUF exam, besides the sites available on the registration page, except abroad, if there are requests and exist demands that justify the request that may be placed until the **28/02/14**, when the option "I want to enter another country" will be removed from the registration page. When choosing the option "I want to enter another country", the application will not automatically consolidated. The new locations, if consolidated, will be forwarded by email to the candidate until the **07/03/14**. However, the application of the examination abroad depends on the collaboration of other institutions not directly involved with the examination, the organizing committee cannot guarantee in advance if and where it will happen. If "new locations" are not made possible until **07/03/14**, indicating the impossibility of the official exam application at the requested location, the applicant that requested these new sites will be informed by email and should make their applications immediately, choosing one of the sites available on the registration page of the EUF.

Once enrolled in EUF, the candidate cannot change the location of the examination.

Candidates should appear at the place of the exam in possession of photo ID, pencil, pen and eraser (the use of calculators and other electronic equipment such as mobile phones, tablets, etc. will not be allowed). The exam will consist only of essay questions.

PROGRAMME OF THE EXAM
The exams will be about five general areas of Physics Undergraduate Program, namely, (1) Classical Mechanics (2) Electromagnetism (3) Modern Physics, (4) Quantum Mechanics (5) Thermodynamics and Statistical Physics. The topics of each area and recommended reading are:

1. Classical Mechanics

a) Newton's laws.
b) one-dimensional motion.
c) Linear Oscillations.
d) Motion in two and three dimensions.
e) Newtonian gravitation.
f) variational calculus.
g) Equations of Lagrange and of Hamilton.
h) Central forces.
i) Particle Systems.
j) Non-inertial frames.
k) Dynamics of rigid bodies.
l) coupled oscillations.

bibliography:
· J. B. Marion and S. T. Thornton, Classical Dynamics of Particles and Systems, 4th Edition, Harcourt, 1995.
· K. R. Symon, Mechanics, 3rd Edition, Addison-Wesley, 1971.
· T.W.B. Kibble, Classical Mechanics, Imperial College Press, 2004.
· A.P. French e M.G.Ebison, Introduction to Classical Mechanics, Chapman and Hall, 1987.
· R.A. Becker, Introduction to Theoretical Mechanics, McGraw-Hill, 1954.

2. electromagnetism

a) the electrostatic fields in vacuum and in dielectric materials.
b) Solution of Laplace and Poisson equations.
c) magnetic fields, steady currents and non-magnetic materials.
d) induced electromotive force and magnetic energy.
e) magnetic materials.
f) Maxwell equations.
g) Propagation of electromagnetic waves.
h) Reflection and Refraction.
i) radiation.
j) Electromagnetism and Relativity.

bibliography:

· D. J. Griffiths, Introduction to Electrodynamics, 3rd Edition, Prentice-Hall, 1981.
· J. R. Reitz, F. J. Milford, R. W. Christy, Fundamentals of Electromagnetic Theory, , 3rd Edition,1982.
· R.K. Wangsness, Electromagnetic Fields, Wiley, 1986.
· E.M. Purcell, Berkeley Physics Course, Electricity and Magnetism, Edgard Blücher,
· J.B. Marion e M.A. Heald, Classical Electromagnetic Radiation, Brooks/Cole (1995).

3. Modern Physics

a) Fundamentals of relativity.
b) Mechanics of relativistic particles.
c) Propagation of light and Newtonian relativity.
d) Experiment of Michelson and Morley.
e) Postulates of special theory of relativity.
f) The Lorentz transformations.
g) Causality and Concurrency.
h) Energy and relativistic time.
i) Thermal radiation, the problem of the black body and the Planck postulate.
j) photon and corpuscular properties of radiation.
k) The Rutherford model and the problem of stability of atoms.
l) The Bohr model.
m) Boltzmann distribution of energy.
n) Atoms, Molecules and Solids.

bibliography:
· R. Eisberg and R. Resnick, Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles 2nd Edition, Wiley, 1985.
· Tipler e R.A. Llewellyn, Modern Physics. 3rd Edition, LTC, 2003.
· W. Rindler, Introduction to Special Relativity, Oxford Univ. Press, 1991.
· A.P. French, Special Relativity, W.W. Norton (1968).
· S.T. Thornton e A. Rex , Modern Physics for scientists and engineers, Brooks Cole, 2005.
· R.A. Serway, C.J. Moses e C.A. Moyer, Modern Physics, Brooks Cole, 2004.
· J. Leite Lopes, Introdução à Teoria Atômica da Matéria, Ao Livro Técnico, 1959.
· H.M. Nussensveig, Curso de Física Básica IV, (chapter 6), Edgard Blücher.

4. Quantum Mechanics

a) Introduction to the fundamental ideas of quantum theory.
b) The mathematical apparatus of quantum mechanics of Schrödinger.
c) formalization of Quantum Mechanics. Postulates. Description Heisenberg.
d) The one-dimensional harmonic oscillator.
e) One-dimensional potentials.
f) The Schrödinger equation in three dimensions. Angular momentum.
g) Central forces and the Hydrogen atom.
h) spinors in non-relativistic quantum theory.
i) Addition of angular momenta.
j) Theory of disturbance independent of time.
k) identical particles.

bibliography:

· C. Cohen-Tannoudji, B. Diu, F. Laloë, Quantum Mechanics, Vols. I and II, 1st Edition, Wiley, 1977.
· S. Gasiorowicz, Física Quântica. Guanabara Dois, 1979.
· E. Merzbacher, Quantum Mechanics 3rd Edition, Wiley 1997.
· R.H. Dicke e J.P.Wittke, Introduction to Quantum Mechanics, Addison Wesley, 1961.
· Levin, Quantum Chemistry, Prentice-Hall, 1991.

5. Thermodynamics and Statistical Physics

a) thermodynamic systems.
b) Variables and equations of state, PVT diagrams.
c) Labor and first law of thermodynamics.
d) mechanical equivalent of heat.
e) Internal energy, enthalpy, Carnot cycle.
f) Phase changes.
g) Second law of thermodynamics and entropy.
h) thermodynamic functions.
i) Practical Applications of Thermodynamics.
j) Kinetic theory of gases
k) Physical Description of a Statistical System.
l) microcanonical ensemble.
m) Canonical Ensemble.
n) Canonical Formalism in Classical Gas.
o) Grand Canonical Ensemble.
p) Ideal Quantum Gas.
q) Ideal Fermi Gas.
r) Bose-Einstein.

bibliography:
· S.R.A. Salinas - Introdução à Física Estatística . Edusp, 1998.
· F. Reif. Fundamentals of Statistical and Thermal Physics. 1st edition. Mc Graw Hill, 1965.
· F. W. Sears and G. L. Salinger. Thermodynamics, Kinetic Theory, and Statistical Thermodynamics , 3rd Edition. Addison Wesley.1975.
· H.B. Callen, Thermodynamics ,Wiley, 1960
· R. Kubo, Statistical Mechanics, North-Holland, 1965
· M. W. Zemansky - Calor e Termodinâmica, Ed. Guanabara Dois, 1978.

GRADING OF EXAMS AND THE DISSEMINATION OF THE RESULTS

The exams will be graded and a final score of 0 to 10 will be assigned, with an accuracy up to the second decimal place, to each candidate reflecting its performance in the exam. The six Graduate Course Commissions involved in the organization of the exam will have access to all the grades, but the same shall not be published *in totum*. Each candidate will receive by post or email to the addresses indicated in the registration form, its final exam score and the quartile in which their grade, in each of the five subjects, was classified.

The deadline for the release of the final scores of the examination for the candidates and the Graduate Programs Coordinators will be May 30, 2014.

THE USE OF RESULTS

Each of the Graduate Program will use the results of the examination for the selection and ranking of candidates, according to their own criteria. Acceptance or non-acceptance into a program does not imply acceptance or non-acceptance in another program.

THE APPLICATION OF THE EXAM

1. The applicant should appear at the place of examination in both days at least 30 minutes prior to the start of the exam for checking documents and signing the attendance list, fitted with a valid photo ID;
2. The tests can be done in pencil or blue or black ink pen;
3. Each stage of the examination will last for four (04) hours beginning at 14h (Brazilian official time);
4. It will not be allowed to query any materials except that contained in the exam material.
5. The use of calculators and/or other electronic equipment such as mobile phones and schedulers will not be allowed.
6. It is not allowed entrance to the examination room after 60 minutes of the start of the tests;
7. Definitive exit of the exam room will be allowed only after 60 minutes from the start of the examination;
8. The candidate can go to the bathroom, only after 60 minutes from the start of each exam and accompaniment by one of the exam supervisors;
9. The draft pages used in the exam will not be considered in the grading, only the information entered in the appropriate answer pages;

ADDITIONAL INFORMATION:

Graduate Office of: IFSC-USP
Web page: http://www.ifsc.usp.br/~posgraduacao
Av. Trabalhador São-carlense, 400 - Centro - 13566-590 - São Carlos, SP, Brazil
POBox 369,
ZIP Code: 13560-970, São Carlos, SP
e-mail: exam_pg@ifsc.usp.br
Telephone: +55(16) 3373-9777/ 3373-8808

Graduate Office of: Instituto de Física “Gleb Wataghin” da Unicamp, IFGW/UNICAMP
Web page: www.ifi.unicamp.br
Rua Sérgio Buarque de Holanda, 777
Cidade Universitária Zeferino Vaz
Barão Geraldo
ZIP Code: 13083-859 - Campinas SP, Brazil
Fax: +55(19) 3521-4142.

Graduate Office of: Instituto de Física da USP
Web page: http://www.if.usp.br/pg
POBox 66318,
ZIP Code: 05314-970, São Paulo, SP, Brazil
e-mail: cpgusp@if.usp.br
Telephone: +55(11) 3091-6901
Fax: +55(11) 3091-6700

Graduate Office of: IFT-UNESP
Web page: http//www.ift.unesp.br
Rua Bento Teobaldo Ferraz 271, Bloco II,
ZIP Code: 01140-070 São Paulo, SP, Brazil
e-mail: secpos@ift.unesp.br
Telephone: +55(11) 5627 7233 e 5627 7232

Graduate Office of: Physics of Federal University of São Carlos - UFSCAR
Web page: http://www.ppgfis.df.ufscar.br/
Rod. Washington Luis KM, 235
POBox 676,
ZIP Code:13.565-905, São Carlos, SP, Brazil
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Fax: +55(16) 3351-8464

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Campus Santo André, Bloco B, 3º Andar
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ZIP Code: 09210-170, Santo André, SP, Brazil
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