



**University of Udine**  
Interdepartmental Centre for  
Research in Education (CIRD)  
Physics Department

*Second INTERNATIONAL GIREP Seminar*

on

# **Quality development in teacher education and training**

**1-6 September 2003  
University of Udine, Italy**

Organized by:

**Groupe International de Recherche sur l'Enseignement de la Physique (GIREP)  
European Physical Society (EPS)– Division of Education  
International Commission on Physics Education of IUPAP (ICPE)  
European Physics Education Network (EUPEN)  
University of Udine, Italy**

with the cooperation of the

**Austrian and Slovenian Sections of GIREP  
International Centre For Mechanical Sciences (CISM)  
National Italian Conference of the University Centres for Research in Education (Concured)**

And with the patronage of the

**Italian Physical Society (SIF)  
Italian Association for Physics Teaching (AIF)  
Regione Friuli Venezia Giulia**

## **Call for contributions**

Reference address: **Prof. Marisa Michelini** - CIRD & Physics Department, via delle Scienze 208, 33100 UDINE, Italy  
Tel. ++39 0432 558210, 558211; ++39 338 7882745 Fax ++39 0432 558222; e-mail: [michelini@fisica.uniud.it](mailto:michelini@fisica.uniud.it)

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### ***Main Organizers***

Brenda Jennison, Marisa Michelini, Silvia Pugliese Jona

## 1. SCIENTIFIC PROGRAMME

### 1.1 The aims of the Seminar

- The Seminar aims to bring together those who are involved with the training of teachers to teach physics throughout the school age range in order that participants will be able to share ideas concerned with 'how to teach student teachers to teach physics in schools'.
- It will focus on what teacher trainers can do with their students in preparing them for work in school, but it will also consider the means, practices, resources and support that encourage and enable physics teachers to achieve, maintain and enhance good quality teaching throughout their professional lives.
- The Seminar hopes to bring together teacher trainers, scientists from universities and industry, researchers in education and school teachers united in a common aim to improve the quality of physics education.

### 1.2 Why is the seminar necessary at this time?

The many factors that make the seminar timely include:

- A new emphasis on the professionalism of teachers that requires a complex interaction of subject knowledge with technical, pedagogical, social, administrative and organisational skills.
- The challenge, in many countries, to recruit and retain in the profession enough high quality physics teachers, at a time when physics graduates have a wide choice of careers available to them.
- The educational demands of a scientific and technologically based society where few citizens understand science well enough to take part in scientific debate on issues of direct concern, and many public figures are proud of the fact that they are not scientifically literate.
- The need for teachers to improve their approach to teaching physics so that recent and relevant scientific knowledge is taught to students in a highly motivating way. Abstract physics must give way to physics in context for most, whilst at the same time preparing others for higher education in physics which may be of an abstract approach. Tools and methods must be offered to students rather than answers to questions which have not been asked.
- The need for physics/science education -o begin at kindergarten and continue throughout schooling. Young students have an enthusiasm for scientific investigation and this needs to be nurtured early and encouraged for all students. Good physics/science education is essential for those who teach our youngest children as it is known that many future scientists have already decided to study science before they leave primary school.
- The likelihood that the mission, organisation and cooperation of Institutions (Universities - Physics and Education Departments - and Teacher Training Colleges) may need to change. There is more to teacher training, and training for other professions too, than subject knowledge!
- There exists of a vast amount of research on teaching and learning that should be properly utilised in meeting the needs of the trainee teacher.
- The interaction of teacher training institutions and schools in the training of teachers

## 2. A SEMINAR, NOT A CONFERENCE

For many years, GIREP conferences have been organised with ICPE (International Commission for Physics Education) part of IUPAP (International Union of Pure and Applied Physics). They are one of the main reference points for the international community concerned with the teaching of physics. They offer a rich environment for the discussion of physics education and research in physics education, bringing together school teachers, subject academics and didactical/pedagogical researchers.

In August 2000 a highly successful GIREP Conference was held in Barcelona (Spain) on the topic "Physics Teacher Education beyond 2000". At that Conference it was resolved that a series of Seminars should be launched, to take place in alternate years, in which the participants would be encouraged to submit papers clearly focused on narrowly defined topics with the aim of facilitating coordinated action.

In **these** Seminars there is more time for discussion and less for presentations. The Seminars, however, are organised in such a way that all the participants have the chance to present their thoughts and research and make their work known. The first GIREP Seminar was held in Udine in September 2001 on the topic "Developing Formal Thinking in Physics". At the end of the 2001 Seminar the participants recommended its organisational structure as a model for future GIREP Seminars - in particular for planning a Seminar on the training of physics teachers, as a follow-up of the Barcelona 2000 Conference.

### 3. THE STRUCTURE OF THE SEMINAR

The Seminar will host Plenary Lectures, Round Tables, Panel Sessions and Workshops.

- The Plenary Lectures and Round Tables will offer overviews of the topics that will be discussed in detail in the Workshops. A final document will be written and approved (see Outcomes).
- The Panel Sessions are amongst the earliest of the Seminar's activities. Their function is to survey all the accepted contributions, in parallel sessions according to topic. They will provide selected materials for the Workshop activities that follow.
- The Workshops are the core of the Seminar and they determine its outcomes. They will benefit from the Plenary Lectures and from the contributions of the participants. The leader of each Workshop will choose from the contributions presented to the Seminar the ones which/he considers most relevant to the Workshop s/he leads.

In each Workshop the discussion will be in five parts:

1. a general overview of the topic;
2. a preliminary discussion of the most important problems;
3. a more thorough discussion into specific aspects and possible solutions of the problem;
4. a general summary;
5. and, finally, a discussion on the contribution of the Workshop to the outcomes of the Seminar

#### TIMETABLE

(I have left justified each of the table entries, for consistency.)

time	Monday 1 <sup>st</sup> Sept	Tuesday 2 <sup>nd</sup> Sept	Wednesday 3 <sup>rd</sup> Sept	Thursday 4 <sup>th</sup> Sept	Friday 5 <sup>th</sup> Sept	Saturday 6 <sup>th</sup> Sept
9.00		Opening Ceremony	Plenary lectures	Workshops in parallel sessions	Workshops in parallel sessions	Reports from Workshops
11.00						
11.30		Plenary lectures	Plenary lectures	Workshops in parallel sessions	Workshops in parallel sessions	Final Documents
13.00		Round Table				Conclusions
Lunch						
14.30		Panel Sessions In parallel	Plenary lectures and Round Table on outcomes	Workshops in parallel sessions	Plenary lectures and Round Table on outcomes	A trip to the heart of Friuli
16.30						
17.00	Registration Welcome	Panel Session (PS) In parallel	Report from PS Workshop presentation	Plenary lectures	Visit to the city	A trip to the heart of Friuli
19.00						
Social events						

### 4. A WORKING DEFINITION OF THE SEMINAR

The seminar can be summed up as one in which the concerns of producing professional physics teachers for the demands of the 21<sup>st</sup> century are central to the programme. Teachers expect to receive high quality initial and inservice education and training as a right.

#### 4.1 Workshop themes

The Workshop activities will be inspired by the following themes.

##### 1) Teacher Education and new technologies

Information and Communication Technologies (ICT) change our society, our way of learning and of communicating. They contribute to school activities and promote the personal involvement of each individual. Telematic networks open new windows on the world and allow the differentiation of class activities, in face-to-face teaching and at a distance. The use of multimedia realises a new context of communication and makes available a tool for work and for learning.

On-line sensors extend our natural senses. Modelling tools open new ways and opportunities for learning in science. The new symbolic world of ICT helps to build bridges for exploring the world and developing formal thinking. Educating teachers in this context is not only a matter of training them to use the new technologies, it also implies helping them to adopt new working patterns. The discussions will include:

- real time interfacing, data logging, modelling and new opportunities for learning;
- supporting school activities, e.g., assessment, extension work, remedial work, 'drill and practice'.

## 2) Initial Teacher Education

The initial training of teaching professionals requires contributions from five major areas:

- pedagogy, psychology, sociology and communications science;
- didactics of the discipline;
- didactic workshops centered on formative activities such as problem solving, planning, and textbook analysis;
- practical activities in schools
- subject knowledge.

These five areas must cooperate in a coordinated, consistent and differentiated way in the education teachers for the upper secondary school, the lower secondary school, and the primary school. A major challenge which we now face is educating primary school teachers so that they are capable of offering a basic scientific knowledge to all children so that they will become citizens who love science and are able to use science in their daily lives. Workshops will be devoted to 'How to.....' sessions, e.g.,

- how do we teach trainees to teach physics concepts?
- how do we equip trainees with a survival kit of 'applied' educational theory?

## 3) In-service Teacher Training and Teacher Training at a distance

A rich and differentiated in-service programme for the updating of teachers must find ways to reach all teachers systematically with an offering closely tied to the teachers' needs in their professional context and to their aspirations for promotion.

The discussions on the means and criteria for obtaining and identifying good quality education will be inspired by experiences and will concern aspects of:

- curriculum updating;
- teaching new ideas in physics and its applications from recent developments in the subject in order to inspire school students.
- new didactical tools, new strategies and new methods.

## 4) Contribution of research into Teacher Training

A high quality education is supported by research: fundamental, applied, and targeted on the school context. Such research calls for the co-operation of two worlds. The discussions will bear mainly on the following issues:

- co-operation between schools and universities;
- contribution of fundamental educational research (e.g. cognitive, curricular) to science education;
- action research;
- research into assessment and evaluation of teacher training.

## 5) The Universities and the:

- implementation of Sorbonne and Bologna agreements;
- the role of universities in teacher education and training;
- the training of university teachers;

The Workshops will be inspired by the four themes listed above, but the number of Workshops and their detailed topics will be determined by the contributions of the participants.

The Workshop configuration will include (i) an introduction by the Workshop leader, (ii) previously agreed upon contributions from the participants, (iii) discussion.

All the Workshops will devote their fifth and last session to the Seminar outcomes (see below).

We ask for three kinds of contributions:

- 1) results of research projects and in-school experimentation centred on any of the issues;
- 2) analysis of papers from GIREP proceedings, on any of the issues, that are useful for teachers;
- 3) thoughts on the Seminar issues in the framework of the themes of the GIREP Working Groups.

## 4.2 The Plenary Lectures

### The topics covered may be:

*The training of teachers as a challenge for achieving quality in science teaching;*  
*Initial teacher training and the improvement of science teaching;*  
*A Worldwide inquiry on teacher training;*  
*Teachers' competences and professional autonomy;*  
*Indications for teacher training from real life experiences;*  
*Peculiar characteristics of the quality and experiences of teacher training in the Far East ;*  
*Experiments with low-cost materials in training teachers;*  
*Toys in teacher training;*  
*Naive conceptions: research results for teacher training;*  
*New languages for a new science curriculum;*  
*Integrating research and training for conceptual change;*  
*Epistemological aspects in the formation of science teachers;*  
*The contribution of associations and thematic networks to the training of science teachers.*

## 4.3 The Panel Sessions

The Panel Sessions will depend on the submitted contributions, but are likely to be drawn from the following list.

*P1-P4: Proposals, models and good practice in teacher training:*

- *for infant school and primary school;*
- *for lower secondary school;*
- *for upper secondary school;*
- *for the university.*

*P5: General problems: how to integrate training in psychology, pedagogy and scientific content ? How can research in education contribute to the training of teachers? What kinds of Didactic workshops are effective? How does apprenticeship in schools contribute? How can the professionalism of teachers be evaluated?*

*P6: Specific contributions to the training of teachers: didactically oriented experimental activities, didactical materials, information and communication technologies, problem solving and planning.*

*P7: Breadth in the initial training of science teachers and guidance.*

*P8: In-service teacher training: experiences and research..*

*P9: Distance training and learning.*

*P10: The contribution of the history and the epistemology of science.*

## 5. OUTCOMES

The following outcomes are expected:

- 1) A collection of papers on issues connected to quality development in teacher education and training, for all grades in school from kindergarten to pre-university level
- 2) A collection of papers on innovation in physics teaching;
- 3) At the end of the Seminar a final document will be written with indications and recommendations on how:
  - to promote co-operation between schools and universities;
  - to produce papers useful for teachers and to help teachers to produce papers themselves;
  - to write criteria for supporting teachers in documenting their own work;
  - to enhance the contributions of institutions to the improvement of teacher training.

## 6. APPLICATION AND CONTRIBUTIONS

Please send your Application Form to Marisa Michelini [michelini@fisica.uniud.it](mailto:michelini@fisica.uniud.it) as soon as possible and not later than 1st April 2003, sending the abstract in English, using the format in Table 1. If possible, please send your Abstract as a WORD file via the Internet.

The participants who wish to make their contributions available beforehand to the workshop leaders may send the full text (no more than five pages, set out in the same way as the Abstract) to the same address not later than 1st June 2003. The contribution should be prepared as a Word file, and sent as an e-mail attachment [michelini@fisica.uniud.it](mailto:michelini@fisica.uniud.it).

## 7. LOGISTICS

### 7.1 Friuli and the city of Udine

Udine is a clean, green and peaceful city of about 150,000 inhabitants, with many monuments and typical sites.

It is the capital city of the Friuli region, positioned in a valley between the Julian Alps and the Adriatic Sea, 90 km from Austria, 40 km from Slovenia, 70 km from Trieste and 125 km from Venice: a veritable bridge between southern and northern Europe.

Friuli has much to offer from the point of view of historical and artistic sightseeing as well as scenictourism. Many towns, like Cividale and Aquileia, conserve ancient memories dating from Roman times. In many other towns the visitor can retrace the march of history through the monuments of different periods. The region has two nature reserves of national importance. One is in the hilly region dominated by ancient castles, the other is in a lagoon close to Grado. Many rivers cross it, with abundant fish. While the mountains of Carnia are known for their wild beauty, the countryside is famous for its wines (merlot, tocai, pinot, refosco), for its grappas, for its cheese (montasio) and for the simple and tasty food (broadada, musetto, frico) that can be eaten in old taverns or in the frequently encountered "frasche".

### 7.2 Public transport in Udine

**CITY BUSES:** from the railway station, every 7 minutes towards the center of the town and the scientific University campus.

### 7.3 The climate

Although Udine is positioned at the foot of the Alps, the temperature can be quite warm in summer (mean September temperature = 25 °C). Do not forget a woollen sweater, however, because at the end of August the weather can suddenly change to breezy and cool.

### 7.4 Accommodation in Udine

Two types of accommodation are available:

**HOTELS.** The hotels that offer special rates through an agreement with the University of Udine are listed in Table 2. Interested participants are invited to make reservations themselves specifying their right to the special rate in the frame of the agreement with the University.

**STUDENT DORMITORY: Erdisu** - Maximum 100 beds are available c/o the Student Dormitories in single rooms with bathroom at the cost of 21 Euros per person per night.

To have a choice in the rooms available, the reservation for accommodation can be made c/o CIRD dell' Udine, e-mail <michelini@fisica.uniud.it>, before **1<sup>st</sup> April 2003**. Reservations can be made not later than **1<sup>st</sup> June 2003**. The reservation is not guaranteed if the rooms are reserved and paid later than this date.

### 7.5 Meals

At the Seminar site, bar service will be available at convenient prices for breakfast and lunch.

The Seminar participants can take their lunches at the University canteen at the special price of 7 Euros per meal, pre-paid to the Secretariat of the Seminar.

In the evening a number of restaurants will serve meals at special prices.

## 8. TRAVEL

### 8.1 How to reach Udine

**BY TRAIN:** Udine is served by the railway that links Rome to Vienna through Firenze, Bologna, Venice. Two trains reach Udine each day in both directions. From 8 am to 8 pm trains link Udine to Trieste-Gorizia (and thus to Eastern Europe) almost every hour and to Venice (and thus to the rest of Italy) every other hour.

**BY CAR:** Highways A4 and A23 link Udine to Austria towards the north, to Venice and the rest of Italy to the west, and to Trieste to the east.

**BY PLANE:** Closest airport is Trieste-Ronchi dei Legionari (35 km from Udine). A bus connects the airport to Udine in 40-50 minutes in connection with the main flights. Bus fare = 15,00 Euros. Venice-Tessera and Venice-Treviso airport are two hours train + bus shuttle (100 km from Udine) easily reachable from Udine and viceversa.

### 8.2 Visas

All visa formalities must be arranged in the home country by the participant. If requested, a declaration by the University of Udine can be issued and sent to participants applying for a visa.

## 9. CONFERENCE FEES

A 140 Euros registration fee includes: a) Organization and mailing costs; b) Seminar programme booklet; c) Bag with paper, pen and tourist information; d) Typical products of Friuli; e) Welcome party and refreshments; f) 'regional' dinner; g) Any other aids to the participants, according to available money; h) The Book of selected papers produced by the Seminar.

## 10. PAYMENTS

**Registration fees:** 140 Euros

70 Euros on registration. The other 70 Euros will be paid to the Conference Secretariat on arrival.

**Accommodation:** Reserving a room in the Student Dormitory: 30 Euros. Reserving a room in Hotel: 100 Euros.

All payments must be made to:

**GIREP - bank account number 0010 46892506**

**bank name: CASSA DI RISPARMIO DI UDINE E PORDENONE - Sede Centrale di Udine - ABI 06340 CAB 12300**

All banking charges must be paid by sender.

In order to be sure that your payments will be acknowledged, be sure to send the documentation of the bank transfer via fax to the Secretariat of the GIREP Seminar 2003 c/o the CIRD of the University of Udine (++39 0432 558222).

## 11. DEADLINES

**1st April 2003** for sending: (1) Application, (2) Request for reservation of accommodation, (3) Proposal of contribution(s), (4) Abstracts of the contributions.

**1st June 2003** for sending: documentation of bank transactions for: (5) registration fee (70 Euros per person) and (6.1) accommodation reservations (30 Euros or 100 Euros per person, respectively for student dormitory and for hotel reservation).

**30 June** for: (7) five page text of the contribution offered, to be considered for workshop discussions, (6.2) Late Student Dormitory reservation (10% increase in cost); (6.3) Cancellation with 100% refunding;

**15 July** for: (6.4) Cancellation with 60% refunding.

## 12. GENERAL INFORMATION



GIREP Seminar 2003

University of Udine

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e-mail: [michelini@fisica.uniud.it](mailto:michelini@fisica.uniud.it)

**ADMINISTRATION:** Ms. Donatella Ceccolin, Antonella - tel. ++39-0432-558210, 558211, fax ++39-0432-558222

E-mail: [Donatella@FISICA.UNIUD.IT](mailto:Donatella@FISICA.UNIUD.IT)

Information on the Seminar, will be updated every week on-line in Internet through the World Wide Web at the following URL:

<http://www.uniud.it/cird/girepseminar2003/>

**Table 1 - Abstracts and papers**

	<i>2cm</i>	
<i>2 cm</i>	<p><b>TITLE</b></p> <p><b>Name1 Surname1, Name2 Surname2, <i>Institution A</i></b>  <b>Name3 Surname3, Name4 Surname4, Name5 Surname5, <i>Institution B</i></b></p> <p>The text must be contained in a box with 2 cm margins on the top, bottom and the two sides. Write the title first in upper case bold and 12 pt. Times New Roman characters. The author's name(s) must be written 1.5 lines under the title (18 pts) in lower case bold and 12 pt. Times New Roman.</p> <p>Besides author's name type a comma and the Institution in lower case italics with the same and size of characters. In case the authors belonging to the same institution, list the authors' names on the same line and type the name of institution only once.</p> <p>Each line of author's names must be separated from the previous one by a 12 pt spacing. Begin the text 1.5 lines under the last line of authors.</p> <p>Length of abstracts must be maximum 2200 characters, including spaces.</p> <p>Length of paper for the Proceedings:</p> <ul style="list-style-type: none"> <li>• General Lectures and Workshop reports, no limits.</li> <li>• Other contributions, no longer than 16000 characters, including spaces (5 pages).</li> </ul> <p>Please quote the references according to the Physics Education editorial standard.</p>	<i>2 cm</i>
	<i>2cm</i>	

**Table 2 - HOTELS WITH SPECIAL AGREEMENT WITH UNIVERSITY**

HOTEL AMBASSADOR ☆☆☆ Via Carducci, 46 (city centre, close to railway station)	☎ ++39.0432.503777 📠 ++39.0432.503711
Single room + breakfast	Euro 67,00
Double + breakfast	Euro 97,00
HOTEL ASTORIA ITALY ☆☆☆ Piazza XX Settembre, 24 (city centre)	☎ ++39.0432.505091 📠 ++39.0432.509070
Single room + breakfast	Euro 96,00
One person in double + breakfast	Euro 112,00
Double + breakfast	Euro 143,00
HOTEL EXECUTIVE ☆☆☆ Via Masieri, 4 (Udine Sud)	☎ ++39.0432.602880 📠 ++39.0432.602858
Single room + breakfast	Euro 80,00
Double + breakfast	Euro 110,00
HOTEL CRISTALLO ☆☆☆ p.le D'Annunzio, 43 (city centre – close to railway station)	☎ ++39.0432.501919 📠 ++39.0432.501673
Single room + breakfast	Euro 53,00
One person in double + breakfast	Euro 63,00
Double + breakfast	Euro 83,00
HOTEL EUROPA ☆☆☆ Viale Europa Unita, 47 (city centre - close to railway station)	☎ ++39.0432.294446 📠 ++39.0432.512654
Single room + breakfast	Euro 47,00
One person in double + breakfast	Euro 62,00
Double + breakfast	Euro 74,00
HOTEL FRIULI ☆☆☆ Viale Ledra, 24 (city centre – Udine West)	☎ ++39.0432.234351 📠 ++39.0432.234606
Single room + breakfast	Euro 58,00
One person in double + breakfast	Euro 65,50
Double + breakfast	Euro 95,00
HOTEL PRESIDENT ☆☆☆ Via Duino, 8 (lat. via Cividale – Udine East)	☎ ++39.0432.509905 📠 ++39.0432.507287
Single room + breakfast	Euro 52,00
One person in double + breakfast	Euro 60,00
Double + breakfast	Euro 80,00
HOTEL PRINCIPE ☆☆☆ Viale Europa Unita, 51 (city centre - close to railway station)	☎ ++39.0432.506000 📠 ++39.0432.502221
Single room + breakfast	Euro 59,90
One person in double + breakfast	Euro 75,00
Double + breakfast	Euro 89,90
HOTEL AL RAMANDOLO ☆☆☆ via Forni di sotto, 28 (city centre - Udine North)	☎ ++39.0432.470994 📠 ++39.0432.479835
Single room + breakfast	Euro 45,00
Double + breakfast	Euro 67,00
HOTEL SAN GIORGIO ☆☆☆ p.le Cella, 2 (city centre – Udine South)	☎ ++39.0432.505577 📠 ++39.0432.506110
Single room + breakfast	Euro 55,00
one person in double + breakfast	Euro 62,00
double + breakfast	Euro 93,00

HOTEL DUE PALME ☆☆ viale L. da Vinci, 5 (city centre – Udine Northwest)	☎ ++39.0432.481807 📠 ++39.0432.480213
Single room + breakfast	Euro 39,00
one person in double + breakfast	Euro 57,00
triple + breakfast	Euro 75,00
HOTEL QUO VADIS ☆☆ p.le Cella, 28 (city centre – Udine south)	☎ ++39.0432.21091 📠 ++39.0432.21092
Single room	Euro 37,00
one person in double + breakfast	Euro 57,00
double	Euro 73,00



*Second INTERNATIONAL  
GIREP Seminar on  
QUALITY DEVELOPMENT  
IN TEACHER EDUCATION AND TRAINING  
1-6 September 2003, University of Udine, Italy*

**APPLICATION FORM**

Please send not later than  
**April, 1<sup>st</sup>, 2003** to  
fax ++39 0432 558222 or  
[michelini@fisica.uniud.it](mailto:michelini@fisica.uniud.it)

<b>Title SURNAME NAME</b>			
<b>Complete address</b>			
<b>E_mail</b>			
<b>PHONE</b>		<b>FAX</b>	
<b>Main topics of interest</b>			
<b>Suggested topics and/or aspects for workshop discussions</b>			
<b>Contribution offered for</b>	<input type="checkbox"/> oral presentation in Panel Session <input type="checkbox"/> workshop discussion <input type="checkbox"/> poster		
<b>Title of the offered Contribution</b>			
<b>Authors and Institutions</b>			
<b>Instruments needed for oral presentation</b>	<input type="checkbox"/> overhead projector <input type="checkbox"/> videorecorder <input type="checkbox"/> videoprojector and computer <b>other (specify)</b>		
<b>comments</b>			

**Abstract in separate sheet**

**Student Dormitory reservation.** Please reserve for me:

from (date of arrival) \_\_\_\_\_ to (date of departure) \_\_\_\_\_  
 n. of nights \_\_\_\_\_ n. of persons \_\_\_\_\_ in (single, double) room \_\_\_\_\_

Signature \_\_\_\_\_