UNIVERSIDAD TÉCNICA DEL NORTE



FACULTAD DE INGENIERÍA EN CIENCIAS APLICADAS CARRERA DE INGENIERÍA EN SISTEMAS COMPUTACIONALES TRABAJO DE GRADO PREVIO A LA OBTENCIÓN DEL TÍTULO DE INGENIERO EN SISTEMAS COMPUTACIONALES

ARTÍCULO CIENTÍFICO (INGLÉS)

TEMA:

AUTOMATIZACIÓN DE LOS PROCESOS ACADÉMICOS DE LAS CARRERAS DE LA FACULTAD DE INGENIERÍA EN CIENCIAS APLICADAS.

AUTOR:

ANDRÉS FERNANDO CÁRDENAS PEPINÓS

DIRECTOR:

Ing. MAURICIO REA

Ibarra – Ecuador

2014



Automating Processes Academic Careers in Engineering Faculty of Applied Science.

Author -Andrés Fernando CÁRDENAS PEPINÓS

Universidad Técnica del Norte, Av. 17 de Julio, Ibarra, Imbabura afcardenasp@utn.edu.ec

Abstract. The "Técnica del Norte" University is an institution of higher education, public and accredited, its mission is to train excellent professionals, that's why they work to improve the quality of the education everyday and all process carried out inside it. "The Direction of the Technological Development and Informatics' of the "UTN" is to improve the academic process being more efficient. It has developed some modules connecting to the main central system existent to improve the attention of all the users of the university.

Keywords

Processes, Efficient.

1. Intro

Currently the H. Academic Council has the challenge to overcome many of the limitations that have arisen during the development of their activities, so many of the processes have not been able to execute in the best way. Several examples can be cited; The semiannual monitoring process planning, schedule management, control classrooms, laboratories and web-enrollment processes that must be optimized in order to better and expedite all the above processes.

Currently the UTN has an Academic System and ERP systems that are integrated several forming the Integrated UTN.

In a second step of this process automation of academic processes systematization of the School of Engineering in Computer Systems. Something to consider is that being a career directly related to the use and implementation of information technologies and communication, there are still processes or procedures that are recorded on paper or on a very basic spreadsheet or a text file.

Everything said has caused long lost and there is a lack of organization in many processes involving the Academic Council H. causing the largest student is injured.

This project aims to improve the management of the Academic Committee giving them tools that allow them to access the information required for monitoring processes semester schedules, timetables Management Control Classrooms, Laboratories and registration via the web.

With all the above beneficiaries will be teachers and students as they will have more information regarding these processes.

It is also important to note that these processes contribute to systematize a quick verification of compliance with some benchmarks.

For the development and implementation of modules for Integrated System UTN Oracle tools will be used as the institution has the right software, these tools are:

- HTML
- CSS
- Open standards.
- JavaScript
- Apex
- Apex Listener.
- Oracle Database 11g.

1

Oracle Forms

2. Materials and Methods

The method used for the development of this project was using processes and procedures which are detailed below:

Processes: A process is the set of activities or tasks, mutually interrelated elements that supports input during development either at the beginning or along the same, which administer, regulate or self-regulate under management models for individual elements output or expected results.

Procedures: Procedures can be defined as the homogeneous modules that are able to specify and elaborate process, which form an ordered set of activities or transactions determined sequentially and are directly related to those responsible for the implementation, as a fundamental part of the procedures is that policies must comply with established rules, procedure duration and flow of documents continue to develop correctly.

A very important feature of the procedure is to be documented throughout the development of these step by step to control execution.

The primary objective of the procedures is to identify and point to what, for what, whom, where?, How?, And when each of the activities comprising the procedures of the various processes and procedures in the UTN regarding the academic process.

This system will focus on the following modules:

Semester schedules

Visual and statistical results obtained from results of previous semesters to know the approximate number of students would be able to enroll in the various subjects of the next academic year, in order to help planning semesters as the estimated number parallel to be opened by subject.

Schedule Development and Management

Add controls that allow not only record the times but also times to help make quick and smart form in order to obtain a schedule without crossing hours taking into account parameters such as working day of each race and teacher availability.

Assigning Physical Spaces

Order to assign the classrooms and laboratories depending on capacity, physical and technological infrastructure that requires each subject while performing a dynamic allocation so there is no crossover of subjects in the same physical space.

Web Registration

Allow students to make a pre-registration taking into account the rules of study credits.

- Web access.
- Identify the student by the number of document.

• Get a list of subjects that the student does not endorse and is even able to enroll.

• Make the selection of the materials by the priorities as:

- Registration number and level of matter.
- Obtain a valid document

To develop the software was used

RUP. Rational Unified Process is a methodology used in software engineering to standardize the process of project development. "RUP iterative development promotes and organizes the development of software and systems in four phases, each consisting of one or more executable iterations of the software at this stage of development."



Source: IBM

Figure 1 Description of Phases RUP

In the Inception phase will take place:

Software Development Plan: The document in which a general approach to the whole project is provided.

Vision Document: This document describes the main features that the project will be described.

Requirements: A System Requirements document will be submitted by the user, detailing the features it will have.

In the Elaboration phase will take place:

Use Case Model Business: Here you define which functions are allocated to each system user role. A diagram of use case specifications and use cases will be shown.

Document architecture: the most important architecture diagrams that composed this system, as the architecture of the tool, the integration of the modules is displayed, the database diagrams and activity diagrams of the processes with the procedures manual respective.

Design: prototypes of Web pages with their features and functionality will be modeled.

In the Construction phase implementation of the structural basis of applications such as database schema and web pages with their validations are performed.

In the transition phase the system is tested with real data and train users in their management of applications, and will be formally transferred to the documentation of the project, indicating the findings and recommendations.

Certain standards organizations like IMS suggested for such tools should be used.

Flexible: The systems are constantly changing and being updated so it is necessary to make a system compatible with new technologies and modular, so adding or removing components.

Accessibility: The system must be available, at anytime and anywhere (obviously having internet access), to use the available resources.

Security: As with any system, you must have access permissions methods and authentication then discuss about the tools to use.

2.1 Tools

Application Server to be used in this project is the Oracle Weblogic 11g EXPRESS APLICATTION development tool Oracle (Apex) in version 4.2.3. This tool is fully compatible with the Oracle database so it will be easy connections to it.

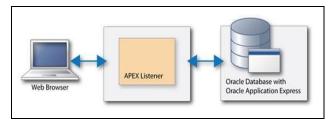
Apex is a tool for web applications very easily and quickly, which benefits the development of the applications and makes the time to optimize as long as the PL / SQL code are well designed. This tool is connected directly to the database, since it is a component that is installed in the Oracle database.

Making a web application in Apex has benefits as the usual dynamic action forms that avoid having to manually develop mechanisms using javascript or AJAX code itself. You can include plug-ins that help place grouped dropdown lists, text fields with mask effects in and out of windows, or other elements.

Applications are made in Apex, you can export and import the database into SQL script type, which facilitates portability and draw backs. Then APEX architecture shown.

Apex has the ability to integrate with SQL language, PL / SQL, along with HTML so facilitating the integration of the database with web applications.

To access an application that Apex is needed on the server is installed and configured correctly so APEX_LISTENER access the application from a web browser.



Fuente: Oracle

Ilustración 2 Arquitectura Oracle Application Express Listener

3. Results

By applying a development methodology, in this case the RUP, allows an orderly work and especially as a result obtain quality software.

As all web applications and be published on the Internet, allowing all users to access the various modules 24 hours a day, 365 days a year from any browser, without installing or configuring specific components.

To access the system you only need a computer with internet access and an updated browser, revenue is not difficult installing more components.

Described below are some benefits to that obtained with the system implementation:

ІМРАСТО	BENEFICIOS
Economic	Process improvement, time savings and utilization of human talent. Savings in maintenance and reuse
	of hardware and software
Social	Increase the prestige of the Technical University of the North.
Technological	Expansion and improvement of the quality of software UTN
Environmental	Reduction of impressions and use of paper.

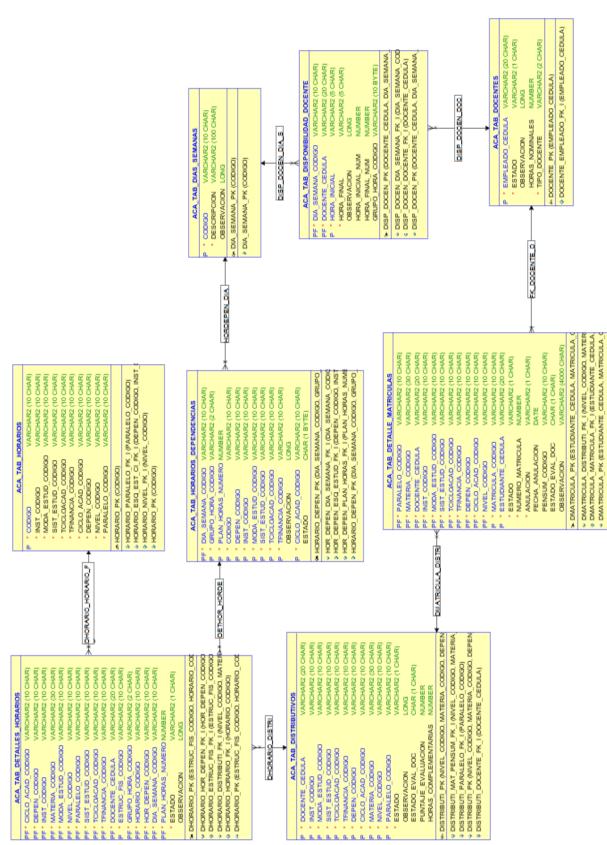
Table Project Impacts and Benefits

Source: Own



3.1 Modelo Conceptual Planificaciones Semestrales

		ITNDD DUIL TAD DEDEANAG	DEDECHIAE
UTNDB.TEM_ESTUDIANTES_MATERIAS			
PF* CODIGO_MATERIA VARCHAR2 (30 CHAR)		P * CEDULA HIGAD NACHAIENTO	VARCHAR2 (20 CHAR)
NIVEL_CODIGO VARCHAR2 (10 CHAR)			
DEPEN_CODIGO VARCHAR2 (10 BYTE)			
INST CODIGO VARCHAR2 (10 BYTE)		NACIONALIDAD	VARCHARZ (ID CHAR)
	FK TEM ESTU REFERENCE RHU TAB	LUGAR_PROCEDENCIA	VARCHAR2 (10 CHAR)
PENSUM CODIGO		TIPO_IDENTIFICACION	VARCHAR2 (1 CHAR)
		* PRIMER_NOMBRE	VARCHAR2 (30 CHAR)
יירע_וםערבאוטטואאובא_איאובאואא (עטטוטען אאובאוא, עבטטרא)		PRIMER_APELLIDO	VARCHAR2 (30 CHAR)
PK_TEM_ESTUDIANTES_MATERIAS (CODIGO_MATERIA, CEDULA)		DIRECCION	VARCHAR2 (100 CHAR)
		FECHA_NACIMIENTO	DATE
		SENERO	VARCHAR2 (1 CHAR)
*		ESTADO_CIVIL	VARCHAR2 (1 CHAR)
		ESTADO	VARCHAR2 (1 CHAR)
FK_IEM_ESIU_KEFEKENCE_ACA_IAB_		SEGUNDO_NOMBRE	VARCHAR2 (30 CHAR)
		SEGUNDO_APELLIDO	VARCHAR2 (30 CHAR)
-		TIPO_SANGRE	VARCHAR2 (10 CHAR)
UTNDB.ACA_TAB_MATERIAS		LIBRETA_MILITAR	VARCHAR2 (20 CHAR)
NIVEL_CODIGO VARCHAR2 (10 CHAR)		* BMAIL	VARCHAR2 (100 CHAR)
CODIGO VARCHAR2 (30 CHAR)		TELEFONO	VARCHAR2 (50 CHAR)
* AREA_ACAD_CODIGO VARCHAR2 (10 CHAR)		CELULAR	VARCHAR2 (12 CHAR)
DEPEN_CODIGO VARCHAR2 (10 CHAR)		FOTO	BLOB
INST_CODIGO VARCHAR2 (10 CHAR)		TCLIENTE	VARCHAR2 (10 CHAR)
00		VALIDADO	VARCHAR2 (1 CHAR)
-		ID_SUBGRUPO_DISCAPACIDAD	NUMBER
DESCRIPCION VARCHAR2 (200 CHAR)		CARNET_CONADIS	NUMBER
CREDITOS NUMBER		PORCENTAJE_DISCAPACIDAD	NUMBER
* HORAS_SEMANALES NUMBER		COD_ETNIA	VARCHAR2 (2 CHAR)
HORAS_LABORATORIO NUMBER		BMAL_INSTITUCIONAL	VARCHAR2 (100 BYTE)
		» PERSONA_PK (CEDULA)	
U_VENERAL		PERSONA_PK (CEDULA)	
		PERSONA_LOCALIDAD CORRESPOND	N I (LUGAR NACIMIENTO)
N		PERSONA_LOCALIDAD_CORRESPON_2 (LUGAR_RESIDENCIA)	N_2 (LUGAR RESIDENCIA)
		PERSONA_LOCALIDAD_CORRESPO	N 1 (LUGAR PROCEDENCIA)
5		PERSONA LOCALIDAD FK LONACH	
LOS			1
CONTRIBUCION VARCHAR2 (1000 CHAR)			
© MATERIA_PK (NIVEL_CODIGO, CODIGO)			
AATEDIA EIE EADMAA' EV IZEIE EADMAA' AADIGAA			
≪ MATERIA_DIE FORMAGE FLI (DIE FORMAGEOULOU) ≪ MATERIA_TMATERIA_FK_I (TMATERIA_CODIGO)			
MATERIA_NIVEL_FK_I (NIVEL_CODIGO)			
AATERIA_PK (NIVEL_CODIGO, CODIGÓ)			
MATERIA_AREA_DEPEN_FK_I (DEPEN_CODIGO, INST_CODIGO, AREA_	CODIGO, AREA_ACAD_CODIGO)		

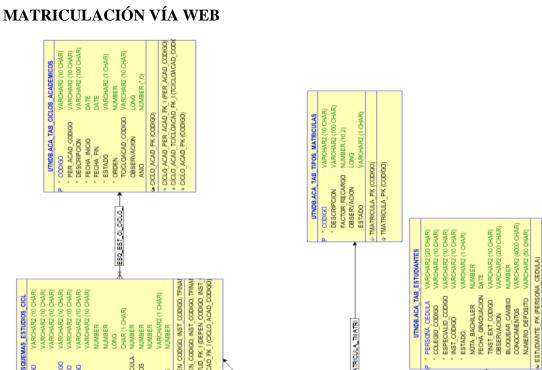


GENERACIÓN DE HORARIOS



DEPEN DEP DEPEN DEPEN FK I (DEPEN INST CODIGO, DEPEN COD DEPEN TDEPEN TENER FK I (TDEPEN CODIGO) VARCHAR2 (100 CHAR) /ARCHAR2 (200 CHAR) (ARCHAR2 (10 CHAR) VARCHAR2 (10 CHAR) /ARCHAR2 (10 CHAR) (ARCHAR2 (10 CHAR) VARCHARZ (10 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (10 CHAR VARCHAR2 (1 CHAR) VARCHAR2 (1 CHAR) UTNDB.ACA_TAB_DEPENDENCIAS LONG DEPEN_PK (CODIGO, INST_CODIGO) DEPEN PK (CODIGO, INST CODIGO) DEPEN INST FK I (INST CODIGO) TESTES TESTE COD SUBAREA UNESCO DEPEN_CODIGO DEPEN_INST_CODIGO TDEPEN_CODIGO ESTADO DESCRIPCION OBSERVACION INST CODIGO NOMBRE FUNCION SIGLAS CODIGO VARCHAR2 (10 CHAR) VARCHAR2 (100 CHAR) UTNDB.INS_TAB_TESTRUCTURAS_RSICAS VARCHAR2 (10 CHAR) TESTRIS TESTRIS FK I (TESTRIS CODIGO) DND FK_ACA_TAB_DEPE TESTRIS_PK (CODIGO) TESTRIS PK (CODIGO) TESTHIS CODIGO OBSERVACION DESCRIPCION 0001000 PK ACA TAB DEPEN ESTRU FISICA (DEPEN CODIGO, INST CODICION) PK ACA TAB DEPEN ESTRU FISICA (DEPEN CODIGO, INST CO ESTRUC_FIS_TES ESTRUC FIS ESTRU UTNDB.ACA TAB DEPEN ESTRU FISICA VARCHARZ (10 CHAR) VARCHARZ (10 CHAR) ESTRUCTURA, CODIGO VARCHAR2 (20 CHAR) ESTRUC FIS ESTRUC FIS FK 1 (ESTRUC FIS CODI SETRUC FIS TESTRIS FK 1 (FESTRIS CODIGO) ESTRUC FIS LOCALIDAD FK 1 (LOCALIDAD CODIGO ESTRUC FIS FK (CODIGO) ESTRUC FIS FK (CODIGO) VARCHAR2 (100 CHAR) VARCHAR2 (100 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (20 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (20 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (20 CHAR) VARCHAR2 (1 CHAR) UTNDB.INS_TAB_ESTRUCTURAS_FISICAS FK_ACA_TAB_ESTR DND BLOB DEPEN CODIGO INST CODIGO ESTRUC FIS_CODIGO DESCRIPCION * ESTRUC FIS PK (CODIGO) LOCALIDAD CODIGO EMPLEADO CEDULA TESTHS CODIGO OBSERVACION NST CODIGO FOTOGRAFIA Ľ. Ľ. CUPO FUNCION NOMBRE ESTADO 00000 HORARIO ESQ EST CI FK I (DEPEN CODIGO, INST CC * HORARIO NIVEL FK I (NIVEL CODIGO) DHORARIO DISTRIBUTI FK I (NIVEL CODIGO, MATERIA CO DHORARIO PK (ESTRUC FIS CODIGO, HORARIO CODIGO, - DHORARIO PK (ESTRUC FIS CODIGO, HORARIO CODIGO, DHORARIO HOR DEPEN FK LIHOR DEPEN CODIGO, DIA VARCHARZ (10 CHAR) VARCHARZ (10 CHAR) VARCHAR2 (10 CHAR) VARCHARZ (10 CHAR) (ARCHAR2 (10 CHAR) VARCHAR2 (10 CHAR) * HORARIO PARALELO PK I (PARALELO CODIGO) DHORARIO ESTRUC FIS FK I (ESTRUC FIS CODIGO) VARCHAR2 (10 CHAR) VARCHAR2 (30 CHAR) VARCHAR2 (10 CHAR) CICLO ACAD CODIGO VARCHARZ (10 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (20 CHAR) VARCHAR2 (20 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (10 CHAR) VARCHAR2 (1 CHAR) UTNDB.ACA_TAB_DETALLES_HORARIOS VARCHAR2 (2 CHAR) DHORARIO HORARIO FK I (HORARIO CODIGO) UTNDB.ACA_TAB_HORARUOS DHORARIO_HOR PLAN HORAS NUMERO NUMBER DNO MODA ESTUD CODIGO TCICLOACAD CODIGO CICLO ACAD CODIGO SIST ESTUD CODIGO PARALELO CODIGO TFINANCIA CODIGO HORARIO PK (CODIGO) HORARIO PK (CODIGO) MODA_ESTUD_CODIGO NIVEL_CODIGO GRUPO HORA CODIGO DIA SEMANA CODIGO SIST ESTUD CODIGO TCICLOACAD CODIGO ESTRUC FIS_CODIGO HOR DEPEN CODIGO DEPEN CODIGO NIVEL CODIGO PARALELO CODIGO * INST CODIGO TFINANCIA CODIGO INST CODIGO DOCENTE CEDULA HORARIO CODIGO DEPEN_CODIGO OBSERVACION 0001000 ESTADO ų, ų,

ASIGNACIÓN DE ESTRUCTURAS FÍSICAS



UTNDB.ACA TAB ESQUEMAS ESTUDIOS CICL					OS NUMBER NUMBER VARCUARY A CUAR		► ESQ EST CI PK (DEPEN CODIGO, INST CODIGO, TFINAL ◆ ESQ EST CI PK (DEPEN CODIGO, INST CODIGO, TFINAL	♦ ESQ_EST_CI_ESQ_ESTUD_FK_I (CICLO_ACAD_CODIGO_INST_ ♦ ESQ_EST_CI_CICLO_ACAD_FK_I (CICLO_ACAD_CODIGO]								MATRICULA_TMATRI			UTNDB.ACA_TAB_ESTL	P PERSONA_CEDULA VARC COLEGIO CODIGO VARC	ESPECIALID CODIGO VARC INST CODIGO VARC	 ESTADO VARC NOTA BACHILLER NUME 	8.			 NUMERO DEPOSITO VARC ESTUDIANTE PK (PERSONA CE 	# ESTUDIANTE INST PK I (INST C
UTNDB.ACA TAB ES	2222	P SIST ESTUD CODIGO P TCICLOACAD CODIGO P TFINANCIA CODIGO	MANNU CREDITOS MAXIMO CREDITOS OBSERVACION	ESTADO SECUENCIA_MATRICULA	NUMERO_PARALELOS CUPO_PARALELO CONTRON_CURDOS	NUMERO_SEMANAS	► ESQ_EST_CI_PK (DEPE ♦ ESQ_EST_CI_PK (DEPE	♦ ESQ_EST_CI_ESQ_EST ♦ ESQ_EST_CI_CICLO_AC		MATRICULA ESQLE						XIII X											
USUARIOS	VARCHARZ (100 CHAR) VARCHARZ (20 CHAR) DATE VARCHARZ (20 CHAR)	VANGARAG (100 CHAR) NUMBER (1,0) NUMBER	VARCHARZ (5 CHAR)	VARCHARZ (2 CHAR) VARCHARZ (4000 CHAR)	VARCHARZ (5 CHAR) VARCHARZ (2 CHAR)		SONA_CEDULA)	•	MATRICULA USUA	 TIMDB.ACA_TAB_MATRICULAS	EDULA VARCHAR2 (20 CHAR)			ODIGO VARCHARZ (10 CHAR) NGO VARCHARZ (10 CHAR)	COGO VARCHARZ (10 CHAR) VARCHARZ (10 CHAR)	0		ACULA NUMBER PCION DATE		_	VARCHARZ (2 CHAR) NUMBER		VARCHARZ (1 CHAR) VARCHARZ (1 CHAR)	STUDIANTE_C	MATRICULA TWATRICULA PK I (TMATRICULA CODIGO) MATRICULA ESQ EST CI PK I (DEPEN CODIGO INST CO	 MATRICULA_USUARIOS_FK_I (USUARIOS_CUENTA) MATRICULA_PK (ESTUDIANTE_CEDULA, CODIGO) 	 MATRICULA_ESTUDIANTE_FK_I (ESTUDIANTE_CEDULA)
UTNDB.INS TAB USUARIOS	CUENTA PERSONA_CEDULA FECHA_CREACION ESPACIO_TRABAJO	PER MUMBRE PERFIL QUOTA DISCO CUBA ID CUENTA PERMITIR CAMBIO CIENTA	DIAS HOLGURA HORA TOPE TRABAJO	IMP_CODIGO OBSERVACION	TOPE COD DOCUMENTO	 USUARIOS PK (CUENTA) 	 USUARIOS_PERSONA_FK_I (PERSONA_CEDULA) USUARIOS_PK (CUENTA) 		IN	UTNDB	PF* ESTUDIANTE_CEDULA	F * INST_CODIGO	F ' MODA ESTUD CODIGO F ' SIST ESTUD CODIGO	F TEICLOACAD CODIGO	F CICLO ACAD CODIGO	F THATRICULA_CODIGO	E USUARIOS_CUENTA	FECHA_INSCRIPCION	OBSERVACION	NIVEL_CODIGO TRAN_NRO_TRANSACCION	EXCNERADO ARRASTRES		CARINE TIZADO CONTINGENCIA	> MATRICULA_PK (E	 MATRICULA_TMAT MATRICULA_ESQ_ 	 MATRICULA_USUA MATRICULA_PK (E) 	 MATRICULA_ESTU
	0.					3	20															1					

TAB NOTAS		ē.	8.9	VARCHARZ (10 CHAR)	MR2 (10 CH	Ĩ	MR2 (10 CH	VARCHAR2 (10 CHAR)	MR2 (10 0	VARCHAR2 (20 CHAR)	VARCHARZ (1 CHAR)	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	DATE	VARCHARZ (4000 CHAR)	VARCHAR2 (4000 CHAR)	CEDULA, MATRICULA_CODIGO,	I (ESTUDIANTE_CEDULA, MATR		DMATRIC	DETALLE MATRICULAS	22	VARCHAR2 (20 CHAR)	MR2 (10 CH	HARZ	VARCHAR2 (10 CHAR)	MR2 (10 CH	HARZ (10 CF	MR2 (10 CF		VARCHARZ (10 CHAR) VARCHARZ (20 CHAR)	20104	NUMBER	VARCHARZ (1 CHAR)	DATE VARCHAR? (10 CHAR)
UTNDB.ACA				PF* SIST ESTUD CODIGO	-	TEMANDA C	DEPEN CO		PF * NIVEL CODIGO	PF* ESTUDIANTE CEDULA	APROBO	NOTA1	NOTA2	NOTA3	NOTA4	NOTAS	RESULTADO1	RESULTADO2	RESULTADO3	FINAL1	FINAL2	FINAL3	NOTA_FINAL	FECHA REGISTRO	RESOLUCION	OBSERVACION	# NOTA_PK (ESTUDIANTE_CE	NOTA_DMATRICULA_FK_I (E	÷	NOTA DW	UTNDB.ACA TAB DE	P MATERIA CODIGO	P * DOCENTE CEDULA	00)(30	P * MODA_ESTUD_CODIGO	P SIST ESTUD CODIGO		PEPEN CO	000	NIVEL COD	PF MATRICULA_CODIGO	· ESTADO	* NUMERO MATRICULA	NOIO	FECHA, ANULACION PENSUM, CODICIO

for any of the second s
ATRICULA
FECHA, ANULACION DATE
DESTRUCT ENVELOUS CHART (1000 CHART)
- DMATRICULA PK (ESTUDIANTE CEDULA, MATRICULA C
DMATRICULA_DISTRIBUTI_FK_I (NIVEL_CODIGO, MATERU
DMATRICULA_MATRICULA_FK_I (ESTUDIANTE_CEDULA,
DMATRICULA_PK (ESTUDIANTE_CEDULA, MATRICULA_C

ESTUDIANTE_INST_FK_1(NIST_CODIGO)
 ESTUDIANTE_COLEGIO_FK_1(CODIGO)
 ESTUDIANTE_COLEGIO_FK_1(CEREDICANI)
 ESTUDIANTE_FERSION_FK_1(FERSION_LODIGO)
 ESTUDIANTE_TINST_EXT_FK_1(TINST_EXT_CODIGO)

UTNDB.ACA_TAB_CICLOS_ACADEMICOS

4. Conclusion

The application is deployed with Oracle and related tools; in which modules of the Technical University of Northern integrated system are implemented.

The user training has been performed with good results, as it has implemented an easy to use graphical interface.

5. Gratitud

I thank the staff of the Directorate of Technological Development and Computer UTN, my teachers throughout my student life knew impart their knowledge.

6. Recommendations

Use development methodology because with this you can make an organized development and above all get quality software. When applying each of the modules to avoid changing information which interacts with each of the modules.

It is recommended that the Department of Informatics and Telecommunications making proper training to new users using each of the modules.

When simultaneous access modules, is necessary to analyze the current infrastructure and if necessary increase the capabilities of these.

Having a program guide, where the parameters and nomenclature to be used in the development of applications.

Bibliography

- GrupNADD. (3 de Julio de 2012). *Rup Metodologia*. Obtenido de Rup Metodologia: http://rupmetodologia.blogspot.com/2012/ 07/metodologia-rup-y-ciclo-de-vida.html
- Adizes Central America, S.A. (2001). *Herramientas para sistemas de calidad.* Obtenido de Herramientas para sistemas de calidad:

http://www.normas9000.com/contactenos. html

- Calero, C., Moraga, M. Á., & Piattini, M. (Calidad del producto y proceso de software). *Calidad del producto y proceso de software*. Madrid: Ra - Ma.
- DR. HUGO SALAZAR, A. D. (2004). *Estatuto* Orgánico UTN. Ibarra: Universitaria.
- Fontela, C. (2011 (reimp. 2013)). UML : modelado de software para profesionales.
- Fox, T., Scott, J., & Spendolini, S. (2011). Pro Oracle Application express 4 2ed. Apress.
- González Pérez, A. (2011). *Gestión de Bases de datos*. Bogotá: Ediciones de la U.
- Jacobson Ivar, B. G. (2010). El Proceso Unificado de Desarrollo de Software. .
- Kimmel, P. (2007). *Manual UML*. Madrid: McGraw-Hill.
- Norte, U. T. (s.f.). *Módulo de Procesos*. Obtenido de Módulo de Procesos: http://svrapp3.utn.edu.ec:7001/apex/f?p=1 06:6:9076261448984::::P6_CODIGO_NO DO:1.2.2.1.3.
- Norte, U. T. (s.f.). *Módulo de Procesos*. Obtenido de Modulo de Procesos: http://svrapp3.utn.edu.ec:7001/apex/f?p=1 06:6:9076261448984::::P6_CODIGO_NO DO:1.2.2.1.5.
- Piattini, M. G., García, F. O., & Caballero, I. (2007). *Calidad de sistemas informáticos*. Alfaomega.
- Pontificia Universidad Catolica del Péru. (2008 de Febrero de 2008). *Blog.pucp*. Obtenido de Blog.pucp: http://blog.pucp.edu.pe/item/19744/quees-un-proceso-definicion-y-elementos
- Pressman, R. S. (2010). Ingeniería del software: un enfoque práctico 7ed. McGraw - Hill.
- Sommerville, I. (2011). *Ingeniería de software 9 ed.* Pearson Educación.

- Tecnovas. (2012). *Tecnovas Informatica*. Obtenido de Tecnovas Informatica: http://www.tecnovas.com/paginas/tecnolo gia/metodologia.htm
- Universidad Técnica del Norte. (12). *Repositorio*. Obtenido de Repositorio: http://repositorio.utn.edu.ec/bitstream/123 456789/1016/1/04%20ISC%20213%20Te sis_Rosa_Andrea_Rea_Lozada.pdf
- Wikipedia. (9 de Septiembre de 2011). *Wikipedia*. Obtenido de Wikipedia: http://upload.wikimedia.org/wikipedia/co mmons/4/4d/Rup_espanol.gif
- WIKIPEDIA. (29 de Noviembre de 2013). WIKIPEDIA. Obtenido de WIKIPEDIA: http://es.wikipedia.org/wiki/Proceso

Sobre los Autores...

Author – Andrés F CÁRDENAS Estudiante de la Carrera de Ingeniería en Sistemas Computacionales de la Universidad Técnica del Norte de la Ciudad de Ibarra Ecuador.